OMAHA METROPOLITAN AREA

ITS EARLY DEPLOYMENT PLANNING STUDY, STRATEGIC DEPLOYMENT PLAN

APPENDICES

E: DEPLOYMENT SCENARIOS
F: PROJECT DESCRIPTIONS
G: SUPPORT TECHNOLOGIES
H: COST ESTIMATE ASSUMPTIONS

NOTE TO READER:

THIS IS A LARGE DOCUMENT

Due to its large size, this document has been segmented into multiple files. All files separate from this main document file are accessible from links (blue type) in the table of contents or the body of the document.

APPENDIX E

Deployment Scenarios

Table of Contents

List of Figures

INTRODUCTION

The analysis of ITS user services, Omaha area ITS goals and objectives, mapping of user services to goals and objectives, and preliminary listing of needs were presented in the " Applicable User Services" draft report submitted to the ITS Steering Committee on July 15, 1995.

Based on the applicable user services and needs identified throughout discussions with focus groups and various stakeholders, a series of ITS projects and programs were developed. Appendix F provides detailed descriptions of each project. Descriptions of the technologies which support the implementation of these projects are presented in Appendix G.

The ITS projects/programs are the basis for development of the "deployment scenarios. Various projects and programs are combined into deployment scenarios for the short, medium and long terms. The implementation of the projects/programs within a scenario will be best realized by a logical, incremental program approach.

The deployment scenarios have been developed for three time frames: short term, medium term, and long term. The phasing allows implementing projects/programs over time as technologies and funding become available.

- **Short-Term Deployment Scenario**-Projects and programs which can begin immediately and be implemented within five years. The short-term plan also provides infrastructure for some of the projects included in medium and long-term plans.

- **Medium-Term Deployment Scenario** -Projects and programs to be implemented within five to 10 years in the future.

- **Lang-Term Deployment Scenario**-Projects and programs to be implemented beyond ten years in the future.

Short-Term Deployment Scenario

While the full functionality of an ITS system for the Omaha metropolitan area may not be realized for several years, it is important to phase the implementation so that the benefits it provides can be realized throughout its development. The objectives in the short-term scenario projects are to apply proven, practical, and cost-effective ITS technologies to help solve current problems, demonstrate their effectiveness, and build on existing applications which have shown success, such as changeable message signs and motorist assist/emergency patrol services. In addition, a multi-modal approach, maximizing on the existing assets and public/private partnership is promoted.

Within the short-term scenario, the focus will be on priority corridors. A number of projects identified in the short-term scenario are recommended for expanded coverage in the medium and long-term scenarios such as Information Kiosks, Highway Advisory Radio (HAR), and Controller/Field Master improvements. For some projects identified in short-term scenario such as CATV and Information Kiosks, basic functions/features are recommended in the short-term scenario and advanced functions/features are recommended for implementation during medium to long-term scenarios.

Medium-Term Deployment Scenario

The medium-term deployment scenario will build upon the foundation established in the short-term scenario. This scenario will include a continuation of ATMS, incident management, ATIS and communication activities, as well as phased implementation of new activities which possess advanced ITS features. In the medium term, implementation of the TMIC will be a critical element.

Proven ATIS technologies and systems will improve traveler dissemination strategies, providing more useful information to the traveling public, and reducing response times for emergency situations. The following projects are recommended in the medium-term scenario. These projects include both new and expanded task for projects initiated in the short-term scenario.

Long-Term Deployment Scenario

ITS technologies have advanced significantly over the past few years. ITS currently is a major focus of national and international entities, even greater changes can be expected in the years ahead.

As technologies advance, new techniques concerning traffic operations and management, traveler information dissemination and incident management activities can be evaluated for inclusion within the Omaha metropolitan area. The most appropriate approaches will be incorporated as they are proven. Potential areas of activity include in-vehicle traveler information and advanced surveillance systems such as vehicle probes and machine vision. Long-term ITS projects can build on efforts started in the short- and medium-term scenarios and could also reflect technical advances over the next few years. Several projects included "demonstration phases" only during the previous scenarios. In this scenario, full-scale implementation is anticipated.

Seven different categories have been identified for ITS projects, as follows:

1. Signal Systems
2. Surveillance
3. Traffic Management and Information Center
4. Traveler Information Systems
5. Incident Management
6. Travel Demand Management
7. Deployment Support

Each of these categories are described below, while detailed descriptions of each project are included in Appendix F. Figures 1 through 4 represent many of the projects graphically. Figure 4 is provided to illustrate the combined short, medium and long-term scenarios presented in Figures 1, 2 and 3.

OMAHA METROPOLITAN AREA ITS

NDOR

MAPA — UNL

SHORT-TERM DEPLOYMENT SCENARIO

NOT TO SCALE

LEGEND

- PRIMARY CORRIDOR
- FREEWAY
- CITY STREET
- CMS (FREEWAY)
- CMS (ARTERIAL TRAILBLAZER)
- CCTV
- KIOSK
- HAR

FIGURE 1

University of Nebraska Lincoln

Meyer, Mohaddes Associates, Inc.

IOWA STATE UNIVERSITY

NEBRASKA MOTOR CARRIERS ASSOCIATION

EARLYSRT.DWG 12-11-95

OMAHA METROPOLITAN AREA ITS

NDOR

MAPA — UNL

MEDIUM-TERM DEPLOYMENT SCENARIO

NOT TO SCALE

LEGEND

- PRIMARY CORRIDOR
- FREEWAY
- CITY STREET
- CMS (FREEWAY)
- CMS (ARTERIAL TRAILBLAZER)
- CCTV
- KIOSK
- HAR
- SMART CORRIDOR DEMO
- ADAPTIVE TRAFFIC CONTROL

FIGURE 2

University of Nebraska Lincoln

Meyer, Mohaddes Associates, Inc.

IOWA STATE UNIVERSITY

NEBRASKA MOTOR CARRIERS ASSOCIATION

MDTERM.DWG 12-11-95

OMAHA METROPOLITAN AREA ITS

NDOR

MAPA — UNL

LONG-TERM DEPLOYMENT SCENARIO

NOT TO SCALE

LEGEND

- PRIMARY CORRIDOR
- FREEWAY
- CITY STREET
- CMS (FREEWAY)
- CMS (ARTERIAL TRAILBLAZER)
- CCTV
- KIOSK
- HAR
- SMART CORRIDOR DEMO

FIGURE 3

University of Nebraska Lincoln

Meyer, Mohaddes Associates, Inc.

IOWA STATE UNIVERSITY

NEBRASKA MOTOR CARRIERS ASSOCIATION

LONGTERM.DWG 12-11-95

OMAHA METROPOLITAN AREA ITS

NDOR

MAPA — UNL

COMBINED SHORT, MEDIUM AND LONG-TERM DEPLOYMENT SCENARIOS

NOT TO SCALE

LEGEND

- PRIMARY CORRIDOR
- FREEWAY
- CITY STREET
- CMS (FREEWAY)
- CMS (ARTERIAL TRAILBLAZER)
- CCTV
- KIOSK
- HAR
- SMART CORRIDOR DEMO
- ADAPTIVE TRAFFIC CONTROL

FIGURE 4

University of Nebraska Lincoln

Meyer, Mohaddes Associates, Inc.

IOWA STATE UNIVERSITY

NEBRASKA MOTOR CARRIER ASSOCIATION

DEPLOY1.DWG 12-11-95

PROJECT CATEGORIES

Category 1. Signal Systems

The focus of this project during the short-term scenario is to implement enhancement of the basic infrastructure for traffic control. During the medium-term scenario, in addition to basic infrastructure, a demonstration of adaptive control is proposed as well as advanced traffic controller demonstration. During the long-term scenario, implementation of adaptive control is proposed as well as advanced traffic control implementation. In addition, significant communications are provided in accordance with the communications master plan discussed in Appendix D.

Signal Timing Plan Preparation

This process includes preparation of signal timing optimization plans, focusing on the analysis of subsystem identification and multi-jurisdictional interface along the arterial priority corridors. A number of priority and congested corridors have been identified through efforts related to existing conditions analysis for this project. This task will benefit from discussions among the TSCF members and their recommendations. In addition, special event signal timing plans will be prepared, including those related to snow/ice events, for "detour" routes related to ***hazmat*** incidents, and emergency evacuation routes. It is anticipated that signal timings will be prepared for approximately 300 intersections in the Omaha metropolitan area during the short-term, and 300 intersections during the medium-term scenario.

Local Traffic Controller and Detection Improvements

The controller improvements will be performed in conjunction with several activities in the short term such as signal timing improvements, multi-jurisdictional coordination, and traffic control system improvements. The controller improvements will be related to software/firmware upgrades for local controllers as well as field master controllers. It is anticipated that controller upgrade will be performed for approximately 150 locations in the Omaha metropolitan area in the short term. Although advanced controller technology will be explored and implemented beyond the short term, this task will include the study of ATC controllers and their applicability in the Omaha metropolitan area. NTCIP (National Transportation Controller/ITS Communications Protocol) should be considered as part of this task. Initial implementations of controller upgrade will focus on congested corridors such as Dodge Road/West Dodge Road and Center Street in Omaha and along the Avenue C Viaduct Project in Council Bluffs.

A related intersection improvement to be reviewed in the short term is the integrity/reliability of existing detection at congested and near congested intersections. This process is anticipated to focus on approximately 100 intersections in the short term. The detection improvements at congested intersections will complement controller improvements and will provide a foundation for traditional and advanced traffic control. Alternative techniques such as image processing should be considered at key intersections where total upgrade is necessary.

During the medium-term scenario, another 150 intersections are recommended for controller and detection upgrade.

Traffic Control Systems

In the short term, focus will be to review existing computerized traffic control hardware/software in Omaha and Council Bluffs. The feasibility of system upgrade should be investigated such as a central control system as well as opportunities for multi-workstation and installation of workstations at agencies that do not possess any systems currently. Furthermore, the systems should provide opportunities for data sharing via a Local Area Network (LAN) to share data internally and externally among agencies. Data to be shared may include traffic volume, cycle length, time-of-day signal timing plans, congestion information, among others. In addition, remote access and control opportunities should be investigated, so that system users and operators can access workstations remotely through notebook/laptop computers. Implementation of advanced traffic control systems will be in the medium-term to long-term scenarios where the next generation of the computerized signal systems will be studied.

Expanded workstations as well as remote control access enhancements, added features such as weather and air quality, detection and local traffic management centers for the Cities of Omaha and Council Bluffs are recommended.

In addition, this project includes upgrading various components of the entire signal systems in the metropolitan area such as:

- New/expanded management center
- New controllers (such as A'IC, NTCIP)
- 3rd/4th Generation traffic control
- Fully integrated multi-jurisdictional interface

Some of these components will be implemented as demonstration projects in a smaller scale for the medium-term depending on the availability of appropriate technologies.

Adaptive Traffic Control

The predominant type of signal systems in the Omaha metropolitan area today are closed-loop systems Development of microprocessor-based signal system components both for central and field elements will likely result in additional changes to signal system operations and configurations. The nature of the ITS Architecture will be to accommodate all types of signal systems. To do this, the appropriate data for signal status and traffic flow used for signal system operations must be made available to the information network.

Fully adaptive control creates fully responsive, on-line traffic control systems. An example is SCOOT (Split, Cycle, and Offset Optimization Technique), developed by the UK Transport and Road Research Laboratory. SCOOT is demand-responsive and adjusts to the cycle time, phase splits and offsets in accordance with an on-line optimization process. SCATS (Sydney Coordination Adaptive Traffic System) provides another example of an fully traffic responsive traffic control system. It was developed by City of Sydney and is distributed by AWA Systems in North America. Some of the elements of the SCATS system are: detects vehicles by lane; adjusts splits/offsets/cycle lengths for each subsystem; internal background offset plan; and marriage/divorce (external offset plans to link adjacent subsystems).

In the medium term, implement a demonstration project along a highly congested priority corridor arterial such as West Dodge/Dodge corridor and/or West Center Road corridor, using real-time adaptive traffic

control such as SCOOT, SCATS or other techniques being developed by FHWA (RT-TRACS). The approximate boundaries for the recommended demonstration project are 132nd Street on the west, 60th Street on the east, West Dodge/Dodge corridor on the north and West Center Road/Center Street on the south. The demonstration project is anticipated to involve approximately 20 to 30 signalized intersections. Appropriate detection and surveillance systems should be integrated with this project.

In the long term, based on the success and results of the demonstration project, traffic adaptive control projects are recommended for implementation involving first the congested corridors, and then the remaining priority corridors.

Category 2. Surveillance

Installation of CCTV surveillance cameras is the primary focus of this task during the short- and medium-term scenarios, while for the long-term scenario, an advanced surveillance and monitoring system is proposed.

This activity will focus on design and implementation of a comprehensive surveillance system that includes both freeway and arterial facilities. The primary components of the basic system will be to provide system detection (via traditional system loop detectors and/or other techniques), CCTV camera installation along freeways and priority corridor arterials, and expansion of weather related detection. In the short term, the focus will be on provision of system detection along freeways and primary congested corridor arterials and adequate CCTV coverage.

The system detection is anticipated to provide measurements of vehicle flow rates, speed, lane occupancy, vehicle classification, and video verification of roadway traffic. In the short term, CCTV is recommended along Dodge Road/West Dodge Road, Center Street/West Center Road, I-80 and I-680 Freeways for a total of 18 locations. Figure 1. illustrates the preliminary locations for CCTV cameras.

For the medium term, implementation of remaining system detection/CCTV coverage along priority corridors are recommended for installation at 20 additional locations (Figure 2).

For the long term, it is recommended that a comprehensive surveillance and monitoring system based on "real-time" information be implemented.

There are several techniques currently being evaluated for advanced surveillance and monitoring purposes including vehicle probes and machine vision. Several technologies are being tested for vehicle probes including Automated Vehicle Identification (AVI) tags and other smart devices. Similarly, significant enhancements in machine vision techniques of image processing are being developed. Based on their results and advances in other technologies, their applicability will be investigated for implementing an advanced surveillance/monitoring system in the Omaha metropolitan area. A related element would be integration of data from these advanced technologies with the ATMIC.

Category 3. Area-wide Traffic Management and Information Center (ATMIC) and Systems

The purpose of this task is to provide a "focal point" for monitoring, processing and disseminating information to users as part of the ATMS/ATIS core infrastructure element.

The ATMIC will provide a foundation for metropolitan area-wide ITS activities and will provide a focal point for data collection, information dissemination, traffic management, and incident response activities. The ATMIC could also provide opportunities for multi-jurisdictional cooperation, education and research, and partnerships with private sector. Detailed functional requirements, hardware and software requirements, including the platform and interface standards, should be developed based on results of the "Strategic Plan".

For the short term, development of functional requirements and design are anticipated while implementation is deferred to the medium-term scenario. Although potential locations might already exist, the technical institutional issues should be investigated. Based on determination of space, staffing, and operational requirements, a location should be identified. Another issue to be evaluated should be an interim ATMIC facility. The interim facility could simply be a location dedicated to data processing and storage where various management centers would share information with each other, agreeing on the message and dissemination method.

Prepare Functional Requirements

The focus of this task will be to prepare detailed functional requirements for input/output, database, and interface requirements, as well as feasibility analysis of location, space and resource requirements (staffing as well as O&M). This activity should be coordinated with FHWA ATMS/ATIS support infrastructure requirements being prepared by Loral, as well as guidelines being finalized by FHWA as part of the "Transportation Management Center Handbook. "

Prepare Design for ATMIC

The design will include PS&E for implementation of the ATMIC. Specifications for all components will be included, addressing the functional requirements as well as physical layout and hardware/software requirements.

ATMIC Implementation

During the medium term, implementation of ATMIC is recommended. This will facilitate implementation of better data fusion and data dissemination. The implementation of ATMIC is critical to the advanced traveler information system and traffic/incident management. The primary system implementation includes:

- Implementation of the designed layout for the center, including the console(s), hardware/software, and associated monitors and equipment
- "Expert system" implementation
- System integration, including full system simulation and operation, encompassing full integration of ATMS/ATIS components

The advanced traffic and incident management system will be developed over medium to long-term scenarios. It will involve concept/functional requirements analysis, design and implementation of an integrated area-wide traffic management system that provides communication and interface at local and regional level on "real-time" basis. Various elements to be considered will include:

Expert Systems

The development of an "expert system" or an interactive database would significantly enhance incident response by system operators. In the medium-term scenario, evaluation and design of an expert system is recommended as a "demonstration project" and should be closely coordinated with the ATMIC implementation. Full-scale development and implementation is recommended for the long-term scenario, which will involve preparation of database of responses and integration with the traffic control system as well as the ATMIC for information dissemination.

Integration of Freeway/Arterial Systems Along Priority Corridors

A "smart corridor" will integrate freeway and parallel arterial facilities to improve traffic operations along the corridor. The concept of "smart corridor" allows for maximizing capacity, facilitating alternate routes in event of incidents. In the medium term, a small scale demonstration project of a "smart corridor" will be implemented which includes L Street/Highway 92/Route 275 on the south, 120th Street on the west, West Center Road/Center Street on the north and 16th Street on the east (Figure 2). This will encompass integration of traffic control at signalized intersections as well as freeway facilities

In the long-term scenario, the "smart corridor" implementation will be expanded to include the area bounded by W Street in the south, 135th Street on the west, West Dodge Road/Dodge Road on the north and 16th Street on the east. Again, this will encompass integration of traffic control at signalized intersections as well as freeway facilities.

Ramp Metering

In this category, ramp metering is also included. Ramp meters consist of traffic signals on freeway on-ramps. The purpose of ramp metering is to control the rate at which vehicles enter the mainline freeway, such that downstream capacity is not exceeded. In turn, this allows the freeway to carry an increased volume at higher speeds. Another benefit of ramp metering is its ability to break up platoons of vehicles that have been released from a nearby intersection. The mainline, even when operating near capacity, can accommodate merging vehicles one or two at a time. However, when groups (i.e., queues) of vehicles attempt to force their way into freeway traffic, turbulence and shockwaves are created, causing the mainline flow to breakdown

In essence, ramp metering redistributes the freeway demand over time-storing any excess demand on the ramps, instead of on the freeway in the form of stop-and-go traffic. While this mode of control is used primarily to reduce the impacts of recurring congestion during peak traffic periods, ramp metering can also be implemented to combat incident-related congestion. For example, meters upstream of the incident area would operate at low metering rates, limited the number of vehicles entering the freeway. Using surface-street CMS and other driver information devices, entering vehicles would be diverted to on-ramps downstream of the incident. These downstream on-ramps would operate with relaxed metering rates (or no metering) in order to handle the increased demand.

Control modes can range from pre-timed (i.e., fixed release rates based on a pre-set schedule) to local traffic responsive (i.e., rate is calculated in response to traffic flows for adjoining mainline detectors) to system-wide control, which looks at an entire corridor and provides more equitable metering rates across the corridor. Use of the latter mode assures that no one meter is unduly restrictive (this mitigates potential queues which back into the surface street).

In the medium term, focus will be,on following activities:

- Evaluate needs. and identify locations
- Functional/communication requirements (time-of-day/dynamic)
- Design and implementation for 10 ramps
- Integration with ATMIC for. these locations

In the long term, implementation of ramp metering is expanded to the remaining freeway ramps in the metropolitan area, as appropriate.

Category 4. Traveler Information Systems

The purpose of this category is to provide reliable, accurate, and timely information which would assist travelers throughout the Omaha metropolitan area.

The traveler information system component of the Omaha metropolitan area ITS program is extensive and critical for the success of the ITS program. There are many activities under the traveler information system component. In the short term, the implementation of activities will be based on the ***basic*** infrastructure needs. The implementation of a traveler information system will occur incrementally. Various tasks are included in the short, medium and long-term scenarios.

Radio Data System (RDS)

During the short-term, this will include establishing a program by which the following elements could be accomplished:

- "Traffic Information Group" consisting of broadcasters/traffic engineers and others to educate and exchange ideas with broadcasters on traffic management.

- Develop a basic procedure for information flow between the agencies and broadcasters to enhance the accuracy and reliability of the information.

- Continue existing radio traffic information services and implement upgrades required such as enhanced communication links.

The traveler information system activities will continue in the medium term with expanded coverage for some elements and implementation of advanced features for some activities.

The Radio Data System (RDS) is a subcarrier system which provides a silent data channel on existing FM radio programs, and has recently been approved as a North American broadcast standard. The objective of this activity will be to use this digital facility to provide an efficient way of conveying travel

information to the public. In turn, this will support sensible route and mode choice, and avoidance of congested or hazardous areas.

The implementation of a digital radio traffic information system is seen as a key ATIS element of ITS in the Omaha metropolitan area. At a relatively simple level, such systems can identify stations that provide traffic updates, turn up the volume when a message is being broadcast, or return the radio to receive the traffic message. These features help to increase the number of travelers that receive and act on the information. Even greater benefits may be realized through the implementation of fully digital trafficmessages. More specifically, this approach can convey a much larger volume of data digitally than spoken messages. In the medium term, an advanced digital RDS will be designed and implemented as a "demonstration project" at a smaller scale. The implementation of digital RDS is largely dependent on private vendor participation. Full-scale implementation is deferred to the long-term deployment scenario.

This approach can convey a larger volume of data than spoken messages, and the information can be recreated from its digital form in the language of the traveler's choice.

Highway Advisory Radio (HAR)

HAR is a proven and available method for dissemination of traveler information. This activity will focus on efforts to provide methods of broadcasting traffic information via HAR services in the Omaha metropolitan area. HAR service can be used to broadcast recorded messages concerning activities such as construction work and road closures. In addition, HAR can be used to advise truckers and other interstate travelers of conditions in the Omaha area. There are two types of HAR proposed for the Omaha area: "regular" (10 watt) along freeways; and "low power" (0.1 watt) along primary corridor arterials.

HAR facilities can be built rapidly onto the existing system. This will provide a valuable outlet for broadcasting data collected at the traffic management center, prior to the implementation of more advanced digital ATIS services. In the short term, the focus will be on congested corridors such as Dodge Road/West Dodge Road, Center Street/West Center Road, I-80, I-680 Freeways and North Expressway. For the short term, 8 low-power and 2 regular HAR's have been recommended (Figure 1). Communications links, voice message recording, system design, associated signing, and implementation are also included in this task. The low-power HAR's will be designed to be interconnected to form a zone. This interconnection of HAR's along with proper equipment and signing allows for synchronization of messages to achieve optimum effectiveness.

In the medium term, HAR implementation is expanded to include remaining priority corridors. In the medium-term scenario, approximately 13 low-power and 2 regular HAR's have been recommended (Figure 2). Other tasks include identification of functional requirements for real-time message generation and development of operational procedures for real-time message generation, verification and updating. A smaller demonstration project involving five HAR's is recommended for real-time message generation and sign activation.

In the long term, HAR implementation is expanded to include future priority corridors of the Omaha metropolitan area. In the long-term scenario, approximately nine low-power HAR's are recommended. In addition, region-wide implementation of real-time message generation and sign activation is recommended. (Figure 3 illustrates the HAR's for the long-term scenario.)

Changeable Message Signs (CMS)

CMS offers a valuable technique to provide motorists with real-time traffic information and, if desired, alternate route selection advisories in advance of key decision points along the freeways and along primary corridor arterials. This activity represents an important element of the ATIS component of the Omaha ITS Master Plan. CMS can provide timely, accurate and reliable information to motorists when installed at critical locations. This can be achieved without the need for special, in-vehicle equipment. Therefore, CMS is particularly valuable for the initial phases of the ATMIC operation.

This activity will focus on both freeway and primary corridor arterials. For arterials, smaller units of CMS, referred to as "Trailblazer", are proposed. The implementation program will consider any portable CMS units currently being used. Activities recommended in the short-term scenario are listed below:

- Design and implement CMS along the freeway in conjunction with the surveillance (CCTV) projects. In the short term, focus will be along I-80 between 1-680/L & Q Streets and Kennedy Expressway and along I-680 north of I-80 up to Highway 64 (Maple Street) with 10 CMS installations (Figure 1).

- Design and implement Trailblazers along primary corridor/congested arterials including Center Street/West Center Road, Dodge Road/West Dodge Road, and 72nd Street with approximately 11 installations (Figure 1).

- Prepare a comprehensive message library which will be disseminated through CMS, assisting travelers during congestion and incidents.

During the medium term, CMS implementation is expanded to include remaining priority corridors. Four regular CMS and 14 Trailblazer installations are recommended (Figure 2). In addition, real-time message generation and route guidance messages via "expert systems" are recommended at a demonstration level.

In the long-term scenario, CMS implementation is expanded to include future priority corridors. Four additional regular CMS and 10 Trailblazer installations are recommended. In addition, real-time message generation and route guidance messages via "expert systems" are recommended for implementation regionwide.

CATV

This activity will design and implement a television-based information service for the Omaha metropolitan area. Review of this information by travelers will be possible through a teletext service and a dedicated cable television channel. The cable channel will present a color-coded map of traffic speeds on the entire freeway system, and potentially priority corridor arterials, in a format suitable for relay into homes in the Omaha metropolitan area. Implementation of a television-based traffic information system is seen as important to the overall success of the ATIS component of ITS in the Omaha metropolitan area. This type of service will assist motorists in their pre-trip planning efforts, allowing them to make more informed choices. In the short-term scenario, a dedicated cable television channel could be implemented. Activities recommended for this project are listed below:

- Provide enhanced system detection throughout the priority corridors, including design and implementation of approximately 30 new system loops.

- This task should be closely coordinated with the surveillance project, since data generated by system detectors would provide a database for generating color coded congestion graphics.

- Prepare a comprehensive database of speed data collected from system detectors throughout the region.

- Develop (purchase, if current graphic technologies are satisfactory) graphics illustrating the congestion along various sections of the freeways/arterials. In the short term, the information to be displayed will be limited to priority corridors.

- Establish a relationship with private/public television entities to broadcast congestion levels.

- Design and implement communications link between the database and broadcasting entities.

An expanded coverage of the system and advanced features will be implemented in the medium and long term.

During the medium-term scenario, the CATV information system will be enhanced to provide some advanced features. Two enhancements are anticipated for CATV based information system: a) the congestion related graphical display for the CATV will include a picture inset window capable of broadcasting live images of major incidents from the proposed CCTV camera system and b) A new teletext service will supplement the cable channel, offering a number of pages of traffic information, selectable by area or information type. The teletext service is an interactive service in that depending on geographic locations, messages could be targeted to provide information relevant to specific geographic areas. The teletext service will be implemented as a demonstration project in the medium-term scenario.

In, the long-term scenario, the offering of interactive teletext service will be expanded.

Information Kiosks/Videotex Systems

This service will ultimately offer traffic and traveler information, weather conditions, transit service inquiries and route planning facilities to the residents. A videotex system comprises a dedicated computer and video terminals linked to the ATMIC or an interim data processing center via telephone lines. This type of service will provide travelers with a reliable source of pre-trip traffic and traveler information at a number of strategic locations. Receipt of this data will allow travelers to make optimal decisions with regard to travel route, time and mode.

In the short term, the system will be a semi-interactive system with limited traffic congestion information and the implementation will be limited to the top 12 major activity centers in the Omaha metropolitan area. However, similar to the CATV information system, the data generated by system detectors will be used in generating graphics for display on video monitors. A number of private entities are in the process of introducing commercial videotex services. Therefore, emphasis in this project will be placed on providing consistent travel data from the ATMIC through an interface to these systems.

Components of this task include:

- locations evaluation, functional requirements relative to congestion, route location, transit facilities, transportation centers as well as other activities
- feasibility of private sector involvement
- information database, graphical displays
- communication links
- system implementation

This service will be expanded during the medium term to add 20 new locations (Figure 2). In addition, enhancements to the basic information system will be provided. The enhancements anticipated include two-way communications between the information kiosks and the traveler information database, interactive information access, and expanded information base including weather conditions, transit service enquiries, multi-modal travel options and route planning facilities to the residents. The expanded capabilities can initially be implemented for the 10 kiosks recommended in the short-term scenario. Based on private vendor participation, the information base on the interactive kiosks will be expanded to include traveler services such as interactive "yellow pages", which would provide convenient directions to tourist and recreational attractions.

The expansion during the long-term scenario will add 21 new locations. In addition, interactive capabilities will be added to remaining information kiosks as well as the interactive "yellow pages" information base.

Computer Bulletin Board Systems (BBS)/Internet

This activity will design and implement a computer-based information service for the Omaha metropolitan area. Review of this information by travelers will be possible through a dedicated computer bulletin board service (BBS) and information provided on the Internet.

The information provided initially could be a color-coded speed map of the primary corridor freeway/arterial system. In addition, future expansion of the system can offer interactive service providing additional information to travelers. Implementation of such a system is seen as a useful component to the overall success of the ATIS program for the Omaha area, considering the growth of personal computer usage in recent years. The BBS system would consist of dedicated computer(s), modem(s), phone lines(s) and communications links to the ATMIC (interim data processing center) via telephone lines. The graphical display of the freeway/arterial system congestions status will be available on the Internet at a specific site. The availability of BBS and the "Internet Site" will be publicized.

In the short term, semi-interactive traffic congestion display information can be provided. Some of the tasks relevant to this project include:

- Provide communications links and graphical displays (similar to information kiosks) for congestion and incident information on Internet.

- Evaluate opportunities for public/private BBS relationships, including HuskerNet, Free-Net, MidNet, and others.

Based on advances anticipated in personal computing technology and communication technologies, advanced interactive displays and enhanced information database will be provided in the medium-term scenario. The enhancements will be similar to those provided with information kiosks.

In-Vehicle Traveler Information

This project is recommended for the long-term scenario. In-vehicle traveler information has two main components: a) electronic road signage and b) dynamic route guidance. The electronic road signage involves increasing driver awareness of road signs and overall highway safety via display of in-vehicle images replicating road signs. The primary components of an electronic signage system include liquid crystal, CRT, head-up displays, infrared and microwave road-to-vehicle communication devices. This system would support both static and dynamic road signs (real time VMS units), communicating the information to the in-vehicle display unit. The approach would be particularly beneficial during conditions of poor visibility, when drivers might otherwise be unable to see signs at the roadside.

Dynamic route guidance systems offer the potential to optimize individual route planning applications - both pre-trip and en-route. In addition, in-vehicle systems can be used as traffic information collection sources or probes. Technical considerations of such a system include in-vehicle navigation system, communications system architecture and interface capabilities with the proposed Omaha area ATMIC. Significant private sector involvement is anticipated for development of route guidance systems.

In the long-term scenario, in-vehicle traveler information system comprising of electronic road signage and dynamic route guidance are anticipated for implementation in the Omaha metropolitan area.

Highway Advisory Telephone (HAT)

This provides access to up-to-the-minute traffic conditions in the form of dial-up voice messages. New systems such as Voice Response Systems (VRS) can handle many simultaneous calls and provide real-time interface to the host database. The VRS uses digitized speech and has capabilities to monitor and log operations as well. In the short term, functional requirements of a such a system will be determined. A review of technologies will be performed to identify appropriate technology for implementation. A "lead agency" should be identified, providing the service. Public/private partnerships should be addressed especially for dissemination of information.

The implementation of a Voice Response Systems (VRS) based HAT is recommended in the medium term. These new systems can handle many simultaneous calls and provide a real-time interface to the host database.

Transit Vehicle Status Monitoring

The activity which is recommended for the medium-term scenario involves providing real-time monitoring of transit and emergency vehicles using Automated Vehicle Locator (AVL) technologies. AVL technologies include Global Positioning System (GPS), Loran C, and Radio Multi-lateration. For example, GPS receivers receive microwave radio signals from several satellites, from which it calculates the location based on radio triangulation. The location information developed can be made available via either information kiosks/videotex and/or audiotex. Videotex has been described earlier; however, audiotex information system provides real-time information via a touchtone telephone access system. Prior to interactive videotex information systems, information can be provided to customers with manual responses supported by computer data retrieval. Subsequently, enhancements can be made, where a single telephone number will be introduced for audiotex service. It is anticipated that a demonstration project will be conducted prior to full-scale implementation.

Category 5. Incident Management

In the short term, the following activities will be focused upon as part of incident management efforts:

- Improve the emergency vehicle access along the priority corridors
- Implement a "dedicated" freeway service patrol (this activity will continue for the medium- and long-term scenarios as well)
- Implement appropriate "reference markers" along the priority corridors for better identification of incident location
- Prepare a comprehensive personnel resource list as well as identification of resources such as fire hydrant location, material removal equipment, etc.
- Establish administrative traffic (incident) management teams including appropriate representatives of the responsible agencies.

In addition, the following activities will begin in the short term and continue into the medium term and long term:

- Incident management team support
- Prepare an "incident response manual"
- Conduct ongoing personnel training programs

In the medium-term scenario, the following activities will be focused upon as part of incident management efforts. Some of the efforts are continuation of activities in the short-term scenario.

- Revise the "Incident Response Manual"
- Identify and prepare equipment storage sites
- Conduct ongoing personnel training programs
- Implement accident investigation sites.

Category 6. Travel Demand Management

The purpose of this task to continue on implementation of existing travel demand management programs and creating new programs for efficient use of transportation facilities.

The travel demand management (TDM) is an extensive and critical task for reducing traffic congestion in the Omaha metropolitan area. The gamut of activities under TDM require implementation phasing to be spread from short term to long term. For the short term, the focus is recommended to be on the following activities:

- Promote land use/transportation integration policies

- Continue promoting variable work hours

- Promote rideshare management. A basic approach would be to develop a computer database in conjunction with "telephone call-in".

- Continue on development of the "reversible lane" concept for directional congestion reduction

- Study feasibility of park-and-ride facilities

- Continue the existing traffic operations monitoring program to study selected locations such as airports, major shopping centers, large employment centers (such as the top 10 activity centers) to continually monitor the traffic operations and efficiency of travel. Ground access improvements will be continued in to the medium and long term to include the top 50 activity centers in the Omaha metropolitan area.

All ITS projects should be coordinated with the existing MAPA construction and improvement program to incorporate the regional communications and ITS infrastructure needs with the construction program.

The travel demand management (TDM) activities are envisioned as on-going activities. In addition to continuation of activities began in the short term, the focus during the medium term is anticipated to be on the following activities:

- Continue on development of the "reversible lane" concept for directional congestion reduction

- Perform demonstration of "smart transit" in approximately two low-density areas of the Omaha metropolitan area

- Evaluate the need for HOV facilities along Priority Corridors initially focusing on freeways such as I-80 and I-680.

- Continue the existing traffic operations monitoring program for ground access improvements at major activity centers to study selected locations such as airports, major shopping centers, large employment centers. , In the medium term, focus of improvements will be expanded to the top 30 activity centers.

- Implement approximately five park-and-ride facilities based on the results of the feasibility study performed during the short-term scenario

For the long term, the primary TDM activities will include the following:

- HOV-Design and implement any HOV facilities as appropriate. At this time, HOV facilities are not needed in the Omaha metropolitan area. However, a needs assessment was recommended for the medium-term scenario. If that assessment reveals the need, then in the long-term scenario, design and implementation of HOV facilities will be considered.

- Demand management support

- Park-and-Ride implementation (five additional sites)

- Smart transit implementation based on results of the demonstration project

Smart Cards for Transit Fare Payment

This activity, which is recommended for the medium-term scenario, involves the design, deployment and evaluation of a smart card system for transit fare payment. Smart cards will allow regular passengers to use transit services without having to pay cash or purchase travel permits. This will enhance convenience for transit users, reduce delays associated with the fare collection process, and offer financial control for the transit operator. It provides a timely service to its passengers and provides the transit operator with data from the smart cards to assess demand and ridership trends to facilitate maintenance of optimum number of transit vehicles.

This activity involves assessment of products from various vendors, development of specifications for the system, system design and implementation. The system should be implemented as a demonstration project prior to region-wide implementation. Participation of the private sector is recommended.

Category 7. Deployment Support

Several programs are proposed in this category which, by and large, continue through the entire short-, medium-, and long-term scenarios.

Signal Coordination Forum

Establish a multi-jurisdictional Traffic Signal Coordination Forum (TSCF) that regularly meets and discusses the multi-jurisdictional issues. Such an activity currently exists to some extent. This task suggests a more comprehensive approach. This committee will provide input to the signal timing development process in the short term as well assist in identification of potential traffic congestion bottlenecks and traffic signal controller equipment modifications. The TSCF should oversee the implementation of improvements that have been identified for short term and beyond. These activities should be coordinated and fully integrated with the overall advanced traffic and incident management system.

Public/Private Partnerships Program

Public/private partnerships are viewed as being essential for the successful wide-area implementation of a number of ATIS components including Information Kiosks/Videotex Systems, CATV information systems, and Bulletin Board services. These partnerships are especially important for implementation of advanced features/technologies. In the short term, establish a committee/focus group to educate, evaluate, encourage and implement public/private partnerships for information dissemination.

Education Program

A series of education programs covering a variety of aspects of ITS activities are recommended to be developed. The implementation of educational programs should be started early, is anticipated to be an on-going process, and will be implemented throughout all scenarios. Education programs may be related to issues such as incident management, travel demand management programs, traffic safety, and advanced technologies in transportation. The activities recommended include the following:

- Develop education materials (brochures, newspaper articles, teaching/training sessions), ***CD-***ROMs, etc, and make available to various stakeholders and traveling public.

- Participate in community events/meet with community groups

- Disseminate information on Internet, computer bulletin boards

- Conduct seminars

- Conduct tours of traffic management facilities

Intermodal Coordination Program

Inter-modal coordination is essential for minimizing delay region-wide, to improve traffic operations, and to utilize existing resources efficiently. The following intermodal coordination activities are recommended to occur in the short term:

- Formulate a committee consisting of representatives from highway, air, transit, rail, etc. and evaluate/identify potential improvements in planning, design, operation and maintenance of facilities.

- Focus on the following primary improvements.
  "Non motorized systems" (pedestrians and bicycle facilities)
  Develop a database and datasharing of alternate modes of travel for TDM purposes
  Establish an inter-modal interface program focusing on efficient travel and goods movement

Area-Wide Signing and Striping Database

This task provides a comprehensive database of existing signing and striping of the metropolitan area which could be integrated with the "route guidance" system as well as used by engineering and operations staff at various agencies. For the short term, a database for the priority corridors is recommended for development.

This task will expand the database of signing and striping information to cover all freeways, major and secondary arterials during the medium-term scenario. The database preparation may be accelerated if there is significant participation from private vendors.

APPENDIX F

Project Descriptions

Table of Contents

SHORT-TERM PROJECT SUMMARY SHEETS

MEDIUM-TERM PROJECT SUMMARY SHEETS

LONG-TERM PROJECT SUMMARY SHEETS

CATEGORY: Signal Systems

PROJECT: S1.1 Signal Timing Plan Development - Phase I

DESCRIPTION:	Develop signal timing optimization plans for approximately 300 traffic signals in the priority corridors. Analyze subsystem identification and multi-jurisdictional interfaces along the priority corridor arterials.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$414,000	***Additional Annual Agency***	
Implementation:		***Personnel/Operations:***	$73,000
Communications:		***Duration***	2 years
- Capital	None	No added maintenance is assumed	
- Annual Lease	None	***Service Life (Years):***	5
STAFFING REQUIREMENTS:	To supervise the work and implementation of timing plans over and above existing staff.		
- Engineering Supervisor	.25	***- Field Supervisor***	.25
- Staff Engineer	.5	***- Field Technician***	***.5***
BENEFITS			
Annual User Benefits:	$16,000,000	***Benefit/Cost Ratio: 89***	
Other:			
FUNDING SOURCES:	CMAQ, NHS through State DOT		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Cycle length, time-of-day plan and end times are to be discussed at the signal coordination forums among all jurisdictions involved.		
COMMENTS:	Important project, since the benefit is high and noticeable by users.		

CATEGORY: Signal Systems

PROJECT: S1.2 Local Traffic Controller and Detection Improvements - Phase I

DESCRIPTION:	Upgrade traffic controllers at approximately 150 intersections in the priority corridors. Upgrade detection at approximately 100 intersections in the priority corridors.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS:			
Study/Design	$483,000	***Additional Annual Agency Personnel:***	None
Implementation:	$4,428,000	***Annual Operations &Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:	It is assumed that this project does not require any added staffing.		
BENEFITS			
Annual User Benefits:	$3,000,000	***Benefit/Cost Ratio:*** 3.8	
Other:			
FUNDING SOURCES:	CMAQ, STP, NHS		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	None.		
COMMENTS:	This project is important since it provides the infrastructure for efficient and reliable traffic signal operation.		

CATEGORY: Signal Systems

PROJECT: S1.3 Traffic Control Systems

DESCRIPTION:	Review existing computerized traffic control hardware in Omaha and Council Bluffs and investigate the feasibility of traffic control system upgrade. Install communications for data sharing via local area network within and among agencies.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$127,000	***Additional Annual Agency Personnel:***	$177,000
Implementation:	$670,000	***Duration:***	5 years
Communications:		***Annual Operations & Maintenance:***	$40,000
- Staffing/Design	$234,000	***(for the centers only)***	
- Capital	$2,125,000	***Duration:***	5 years
- Annual Lease	None	***Service Life (Years):***	10
STAFFING REQUIREMENTS	It is assumed that Council Bluffs requires 35% of the staffing and Omaha will require 65 % .		
- Engineering Supervisor	.38	***- Field Supervisor***	.38
- Staff Engineer	1.5	***- Field Technician***	***1.5***
BENEFITS			
Annual User Benefits:	$3,000,000	***Benefit/Cost Ratio: 4.8***	
Other:			
FUNDING SOURCES: STP, CMAQ			
PUBLIC/PRIVATE PARTNERSHIP: Not common for this project, although for communications there might be an opportunity to share the cost with other interested parties, such as other public agencies and/or private entities.			
INSTITUTIONAL CONSIDERATIONS: LAN configuration and protocols between agencies should be discussed. In addition, the project implementation should be discussed as to whether an agency should lead it or separate agencies would implement their own.			
COMMENTS: The communications and system upgrade is very important as it provides the infrastructure for many other improvements.			

CATEGORY: Surveillance

PROJECT: S2.1 CCTV Installation - Phase I

DESCRIPTION:	Install CCTV cameras along freeways and congested arterials in the priority corridors at approximately 18 locations.		
APPLICABLE USER SERVICE:	Traffic Control, Incident Management		
COSTS			
Study/Design	$ 98,000	***Annual Operations & Maintenance:***	$72,000
Implementation:	$911,000		
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$ 60,000		
STAFFING REQUIREMENTS:	No additional stafftng assumed.		
BENEFITS			
Annual User Benejits:	$1,500,000	***Benefit/Cost Ratio:***	6
Other:			
FUNDING SOURCES:	CMAQ STP,IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possible opportunity subject to institutional considerations.		
INSTITUTIONAL CONSIDERATIONS:	The privacy issue should be discussed as well as opportunities for public/private partnerships for other public or private interested parties to access the view.		
COMMENTS:	Important and basic element in surveillance capabilities. Visual verification of accidents and incidents will reduce the response time significantly.		

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: S3.1 Functional Requirements Study

DESCRIPTION:	Define detailed requirements for input/output, database, and interface functions at ATMIC. Analyze feasibility of ATMIC based on location, space, and resource requirements, such as staffing, operations, and maintenance.
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Pre-Trip Information, Public Transportation Management, En-Route Transit Information

COSTS

Study/Design	$69,000	***Additional Annual Agency Personnel:***	None
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***This is a study only.***	
- Annual Lease	None		

STAFFING REQUIREMENTS:
No additional staffing required.

BENEFITS

Annual User Benefits: ***Benefit/Cost Ratio:***

Other: ATMIC provides foundation for area-wide ITS activities and focal point for data collection, information dissemination, and traffic and incident management.

FUNDING SOURCES:	STP, CMAQ
PUBLIC/PRIVATE PARTNERSHIP:	During the course of the study, possible role for private entities, such as the media, should be identified which may lead to subsequent partnerships.
INSTITUTIONAL CONSIDERATIONS:	The functional requirements study should be performed to include staffing, lead agency, and operating/maintaining agency are discussed. Potential lead agencies at this time could be the City of Omaha or NDOR.
COMMENTS:	The study does not obligate the agencies to proceed with a center. It provides an insight as to whether it is needed.

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: S3.2 Design

DESCRIPTION:	Design ATMIC, including PS&E for implementation. Specifications for all components will be included, addressing the functional requirements and physical layout and hardware/software.
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Pre-Trip Information, Public Transportation Management, En-Route Transit Information

COSTS

Study/Design	$250,000	***Additional Annual Agency Personnel:***	$24,000
Implementation:	None	***Duration:***	1 1/2 yrs.
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None	***This is design only.***	
- Annual Lease	None		

STAFFING REQUIREMENTS: This includes involvement during the design process,

- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	***.25***	***- Field Technician***	

BENEFITS:

Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	ATMIC provides foundation for area-wide ITS activities and focal point for data collection, information dissemination, and traffic and incident management.

FUNDING SOURCES:	STP, CMAQ
PUBLIC/PRIVATE PARTNERSHIP:	Potential private entities such as the media should be involved during the design phase.
INSTITUTIONAL CONSIDERATIONS:	Requires a lead agency to supervise and coordinate the design. In addition, all agencies as well as private entities involved should provide input during the design process.
COMMENTS:	

CATEGORY: Traveler Information Systems

PROJECT: S4.1 Radio Data System (RDS) Development

DESCRIPTION:	Initiate development of RDS by: (1) forming a "Traffic Information Group" composed of representatives of broadcast media, emergency response services, and roadway agencies to educate and exchange ideas on traffic management; (2) develop basic procedure for information flow between agencies and broadcasters; and (3) upgrade communications links.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management, Pre-Trip Information		
COSTS			
Study/Design	$23,000	***Additional Annual Agency Personnel:***	None
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	***None***	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benejits:	$480,000	Benefit/Cost Ratio: 80	
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility with media and/or other private entities in information dissemination industry.		
INSTITUTIONAL CONSIDERATIONS:	Discussion among agencies are required for consistency and accuracy of information. In addition, the type of arrangement with media and/or other private entities should carefully be looked at.		
COMMENTS:	Very cost-effective approach to inform users.		

CATEGORY: Traveler Information Systems

PROJECT: S4.2 Highway Advisory Radio (HAR) - Phase I

DESCRIPTION:	Install two lo-watt and eight 0.1 watt HAR units serving the higher volume roadways in the priority corridors, including the I-80/680/480 freeways, Dodge Street/West Dodge Road, and Center Street/West Center Road. Communications links, voice message recordings, system design, associated signing, and implementation are included.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management		
COSTS:			
Study/Design	$92,000	***Additional Annual Agency Personnel:***	($29,000 first 3 years and implementation, then 25% - $7,000)
Implementation:	$240,000	***Annual Operations & Maintenance:***	$5,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$24,000		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	.2	***- Field Technician***	***.2***
BENEFITS			
Annual User Benefits:	$480,000	***Benefit/Cost Ratio: 5.9***	
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSIHP:	Strong possibility with private entities interested in disseminating traveler information.		
INSTITUTIONAL CONSIDERATIONS:	Credibility of the information is at stake in terms of information accuracy, timeliness, and applicability.		
COMMENTS:	This project's effectiveness will be enhanced when followed by Phase II and III. It increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: S4.3 ChangeabIe Message Signs (CMS) - Phase I

DESCRIPTION:	Design and install CMS at 10 locations on freeways and 11 locations on arterials in the priority corridors, including preparation of a comprehensive "message" program.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management		
COSTS			
Study/Design	$ 230,000	***Additional Annual Agency Personnel:***	$ 36,000
Implementation:	$2,593,000	***Annual Operations & Maintenance:***	$100,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$50,000		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.2	***- Field Supervisor***	.1
- Staff Engineer	.3	***- Field Technician***	.2
BENEFITS			
Annual User Benefits:	$1,100,000	***Benefit/Cost Ratio: 2.1***	
Other:			
FUNDING SOURCES:	CMAQ, STP		
PUBLIC/PRIVATE PARTNERSHIP:	Not common in this project, although CMS offers opportunity for potential advertising.		
INSTITUTIONAL CONSIDERATIONS:	Effectiveness of CMS is an issue dependent on the accuracy of the message and its timeliness.		
COMMENTS:	Important since several programs are dependent upon CMS, such as incident management.		

CATEGORY: Traveler Information Systems

PROJECT: S4.4 Cable TV (CATV) System - Phase I

DESCRIPTION:	Design and implement a CATV system to provide traffic information to the metropolitan area. Phase I includes: (1) design and installation of approximately 30 system loops in the priority corridors; (2) design and installation of communications links to broadcast media; (3) development of display graphics; and (4) preparation of speed detectors.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS			
Study/Design	$ 133,000	***Additional Annual Agency Personnel:***	$38,000
Implementation:	$1,037,000	***Annual Operations & Maintenance:***	$50,000
Communications:			
- Study/Design	$ 97,000		
- Capital	$885,000	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	.2
- Staff Engineer	.2	***- Field Technician***	.3
BENEFITS			
Annual User Benefits:	$480,000	***Benefit/Cost Ratio:***	1.1
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong public/private opportunity exists where a vendor provides funding in exchange with access/use of the CATV facilities.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required to supervise the design and implementation of this program.		
COMMENTS:	Increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: S4.5 Kiosks/Videotex System - Phase I

DESCRIPTION:	Design and implement a kiosk/videotex system to provide traffic information at approximately 12 major activity centers in the metropolitan area. Phase I includes design and installation of graphical displays, communication links, and database.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information, En-Route Transit Information		
COSTS			
Study/Design	$41,000	***Additional Annual Agency Personnel:***	$16,000
Implementation:	$228,000	***Annual Operations & Maintenance:***	$60,000
Communications:			
- Capital	None	***Service Life (Years):***	***20***
- Annual Lease	$24,000		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	***.2***	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$210,000	***Benefit/Cost Ratio: 1.6***	
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility.		
INSTITUTIONAL CONSIDERATIONS:	Identification of location, content of the database, sequencing, etc. are key factors for success of this program.		
COMMENTS:	Increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: S4.6 Internet/Computer Bulletin Board System (BBS) - Phase I

DESCRIPTION:	Design and implement a computer-based traffic information system for the metropolitan area. Phase I includes the design and installation of graphical displays and communications links.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS			
Study/Design	$41,000	***Additional Annual Agency Personnel:***	$19,000
Implementation:	$228,000	***Annual Operations & Maintenance:***	$25,000
Communications:			
- Capital	None	***Service Life (Years):***	5
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.25	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$210,000	***Benefit/Cost Ratio:***	1.8
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility either independently or as part of other traveler information systems projects.		
INSTITUTIONAL CONSIDERATIONS:	Requires lead agency for consistency and coordination.		
COMMENTS:	Increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: **Traveler Information Systems**

PROJECT: **S4.7 Highway Advisory Telephone (HAT) Study - Phase I**

DESCRIPTION:	Define the functional requirements and investigate the feasibility of a HAT system to serve the metropolitan area. Study includes the identification of appropriate HAT technologies, lead agency for providing service, and private partners.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS			
Study/Design	$58,000	***Additional Annual Agency Personnel:***	$11,000
Implementation:	None	***Duration:***	2 years
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	***5***
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engine&	.1	***- Field Technician***	
BENEFITS			
Annual User Benejits:		***Benefit/Cost Ratio:***	
Other:	Determines feasibility of HAT, which may increase traffic information dissemination and private sector involvement in ITS deployment		
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility independently or as part of other ITS projects.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency for consistency and coordination is required.		
COMMENTS:	Increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Incident Management

PROJECT: S5.1 Freeway Service Patrol (FSP) - Phase I

DESCRIPTION:	Implement a FSP to operate during weekday peak periods over approximately 20 miles of freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design	None	***Additional Annual Agency Personnel:***	$75,000
Implementation:	$200,000	***Annual Operations &Maintenance:***	$100,000
Communications:	Included in O&M .4 driver @ 50% time is assumed		
		Service Life (Years):	***5***
STAFFING REQUIREMENTS			
- ***Drivers***	**4**	- ***Field Supervisor***	***.1***
- ***Staff Engineer***	**.2**	- ***Drivers***	.2
BENEFITS			
Annual User Benefits:	$970,000	***Benefit/Cost Ratio: 4.2***	
Other:	Very well received by the public.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility to involve private tow truck companies.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required for coordination. In addition, public education is necessary for this project.		
COMMENTS:	Several of the existing FSP programs ***use*** private tow truck companies. This project improves public relations and reduces duration of incidents.		

CATEGORY: Incident Management

PROJECT: S5.2 Emergency Vehicle Access

DESCRIPTION:	Construct emergency vehicle access ramps at approximately five locations on the freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design	$5,000	NDOR staff will implement this project. It is assumed that no additional staff is required.	
Implementation:	$45,000	***Annual Operations & Maintenance:***	$2,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:	$66,000	***Benefit/Cost Ratio:***	8.3
Other:			
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency should be identified for maintenance of these facilities.		
COMMENTS:	Identified as an important project by the Incident Management Focus Group. This project reduces incident response times.		

CATEGORY: Incident Management

PROJECT: S5.3 Reference Markers

DESCRIPTION:	Install reference markers at 0.2-mile intervals on the freeways and interchange ramps in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design	$10,000	NDOR staff will implement this project. No additional staffing has been assumed.	
Implementation:	$80,000	***Annual Operations & Maintenance:***	$5,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:	$91,000	***Benefit/Cost Ratio: 8.3***	
Other:			
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Not applicable.		
INSTITUTIONAL CONSIDERATIONS:	Consistency with other similar signs and adjacent agencies should be considered.		
COMMENTS:	Identified as an important project by the Incident Management Focus Group. This project reduces incident response times.		

CATEGORY: Deployment Support

PROJECT: S7.1 Traffic Management Forum - Phase I

DESCRIPTION:	Establish a Traffic Management Forum composed of agencies with traffic signals in the metropolitan area, which meets regularly to discuss multi-jurisdictional issues. Activities during Phase I focus on coordination of signal timing plan development, equipment upgrades, and traffic signal systems.
APPLICABLE USER SERVICE:	Traffic Control
COSTS:	No cost has been assumed.
STAFFING REQUIREMENTS:	No additional staffing has been assumed.
BENEFITS	
Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates the deployment of ITS technologies and the establishment of an ATMIC.
FUNDING SOURCES:	Not needed.
PUBLIC/PRIVATE PARTNERSHIP:	Not applicable.
INSTITUTIONAL CONSIDERATIONS:	Consensus building will be a key issue at this Forum. A lead agency should be identified which could possibly rotate, per members' wishes.
COMMENTS:	This forum is considered an important arena to discuss traffic management and signal coordination issues.

CATEGORY: Deployment Support

PROJECT: S7.4 Intermodal Coordination Program - Phase I

DESCRIPTION:	Form a committee consisting of representatives of various modes to identify ITS applications for improving intermodal coordination.
APPLICABLE USER SERVICE:	Travel Service Information, Demand Management and Operations, Pre-Trip Information, Public Transportation Management, Freight Mobility

COSTS

Study/Design:	$230,000	***Additional Annual Agency Personnel:***	$6,000
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		

STAFFING REQUIREMENTS

- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	

BENEFITS

Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates ITS deployment.

FUNDING SOURCES: CMAQ

PUBLIC/PRIVATE PARTNERSHIP:	Private service providers and various user organizations should be involved in this program.
INSTITUTIONAL CONSIDERATIONS:	A lead agency is required to establish this program.

COMMENTS:

CATEGORY: Deployment Support

PROJECT: S7.5 Area-wide Signing and Striping Database - Phase I

DESCRIPTION:	Development of signing and striping database for priority corridors.		
APPLICABLE USER SERVICE:	Route Guidance		
COSTS			
Study/Design	$138,000	***Additional Annual Agency Personnel:***	$10,000
Implementation:	$316,000	***Duration:***	2 years
Communications:		***Annual Operations &Maintenance:***	$13,000
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	10
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer	.2	***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Essential for in-vehicle traveler information system in long-term and supports traffic control and incident management.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Access to this database may be of interest to many private organizations.		
INSTITUTIONAL CONSIDERATIONS:	Formatting, extent of the content of the database, and compatibility with other agency databases will be key considerations for the success of this program.		
COMMENTS:			

CATEGORY: Signal Systems

PROJECT: Ml.1 Signal Timing Plan Development - Phase II

DESCRIPTION:	Develop signal timing optimization plans for approximately 300 traffic signals in the priority corridors. Analyze subsystem identification and multi-jurisdictional interfaces along the priority corridor arterials.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$414,000	***Additional Annual Agency***	
Implementation:		***Personnel/Operations:***	$73,000
Communications:		***No added maintenance is assumed***	
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	***5***
STAFFING REQUIREMENTS			
- Engineering Supervisor	***.25***	***- Field Supervisor***	***.25***
- Staff Engineer	***.5***	***- Field Technician***	***.5***
BENEFITS			
Annual User Benefits:	$5,400,000	***Benefit/Cost Ratio:***	89
Other:			
FUNDING SOURCES:	CMAQ, NHS through State DOT		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Cycle length, time-of-day plan and end times are to be discussed at the signal coordination forums when multi-jurisdictions are involved.		
COMMENTS:	Important project, since the benefit is high and very noticeable by users.		

CATEGORY: Signal Systems

PROJECT: Ml.2 Local Traffic Controller and Detection Improvements - Phase II

DESCRIPTION:	Upgrade traffic controllers and detection for an additional 150 intersections in the priority corridors and other key locations.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$483,000	***Additional Annual Agency Personnel:***	None
Implementation:	$4,428,000	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS	It is assumed that this project does not require any added staffing.		
BENEFITS			
Annual User Benefits:	$1,200,000	***Benefit/Cost Ratio: 4.5***	
Other:			
FUNDING SOURCES:	CMAQ, STP, NHS		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	None.		
COMMENTS:	Important project, as this project provides the infrastructure for efficient and reliable traffic signal operation.		

CATEGORY: Signal Systems

PROJECT: Ml.3 Traffic Control Systems

DESCRIPTION:	Upgrade traffic control systems in Omaha and Council Bluffs, including hardware/software, local traffic management centers, additional workstations for other jurisdictions, and enhanced data sharing capabilities.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$92,000	***Additional Annual Agency Personnel:***	$177
Implementation:	$316,000	***Duration:***	10 years
communications:		***Annual Operations & Maintenance:***	$40
- Design	$205,000	***Duration:***	10 years
- Capital	$1,940,000		
- Annual Lease	None	***Service Life (Years).-***	10
STAFFING REQUIREMENTS			
- Engineering Supervisor	.38	***- Field Supervisor***	.38
- Staff Engineer	1.5	***- Field Technician***	1.5
BENEFITS			
Annual User Benefits:	$1,200,000	***Benefit/Cost Ratio:***	5.7
Other:			
FUNDING SOURCES: STP, CMAQ			
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project, although for communications there might be an opportunity to share the cost with interested parties.		
INSTITUTIONAL CONSIDERATIONS:	System protocols for data sharing and database should be discussed. Coordination between agencies should include management, engineering as well as operations and maintenance staff for compatibility and consistency purposes.		
COMMENTS:	The communications and system upgrade is very important as it provides the infrastructure for many other improvements.		

CATEGORY: Signal Systems

PROJECT: Ml.4 Adaptive Traffic Control Operational Test

DESCRIPTION:	Conduct operational test of adaptive traffic control system involving approximately 25 intersections along a highly congested priority corridor arterial such as Dodge Street/West Dodge Road and/or Center Street/West Center Road. Project includes design, implementation, and evaluation,		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$69,000	***Additional Annual Agency Personnel***	$60,000
Implementation:	$601,000	***Duration:***	3 years
Communications:		***No Annual Operations & Maintenance has been assumed.***	
- Design	$75,000		
- Capital	$625,000		
- Annual Lease	None	***Service Life (Years):***	5
STAFFING REQUIREMENTS			
- Engineering Supervisor	.25	***- Field Supervisor***	***.2***
- Staff Engineer	.5	***- Field Technician***	.25
BENEFITS			
Annual User Benefits:	$3,800,000	***Benefit/Cost Ratio:***	10
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possible, especially in the area of information dissemination.		
INSTITUTIONAL CONSIDERATIONS:	Public education is an important element in this project as drivers' expectations of the traffic signal operation changes.		
COMMENTS:			

CATEGORY: **Signal S ystems**

PROJECT: **Ml.5 Advanced Traffic Control Operational Test**

DESCRIPTION:	Conduct operational test of advanced traffic control featuring advanced controllers such as ATC and NTCIP; 3rd/4th generation traffic control; fully integrated multi-jurisdictional interfaces; and expanded management center. Project includes design and implementation involving approximately 20 intersections.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS			
Study/Design	$55,000	***Additional Annual Agency Personnel:***	$28,000
Implementation:	$506,000	***Duration:***	***2*** years
Communications:		***Annual Operations & Maintenance:***	$25,000
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	***5***
STAFFING REQUIREMENTS			
- Engineering Supervisor	.l	***- Field Supervisor***	.l
- Staff Engineer	***.25***	***- Field Technician***	.l
BENEFITS			
Annual User Benefits:	$160,000	***Benefit/Cost Ratio: 0.9***	
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possibility will be to attract vendors and/or entities interested in using some of the ATC features such as air quality measurement, etc.		
INSTITUTIONAL CONSIDERATIONS:			
COMMENTS:			

CATEGORY: Surveillance

PROJECT: M2.1 CCTV Installation - Phase II

DESCRIPTION:	Install additional CCTV cameras at approximately 20 locations to extend CCTV detection on freeways and congested arterials in the priority corridors.		
APPLICABLE USER SERVICE:	Traffic Control, Incident Management		
COSTS			
Study/Design	$110,000		
Implementation:	$1,021,000	***Annual Operations & Maintenance:***	$90,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$60,000		
STAFFING REQUIREMENTS	No additional staffmg assumed.		
BENEFITS			
Annual User Benefits:	$1,500,000	***Benefit/Cost Ratio: 4.5***	
Other:			
FUNDING SOURCES:	CMAQ, STP, IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possible opportunity subject to institutional considerations.		
INSTITUTIONAL CONSIDERATIONS:	The privacy issue should be discussed as well as opportunities for public/private partnerships for other public or private interested parties to access the view.		
COMMENTS:	Important and basic element in surveillance capabilities. Visual verification of accidents and incidents will reduce the response time significantly.		

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: M3.1 ATMIC Implementation

DESCRIPTION:	Implement ATMIC including center layout and system integration.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Pre-Trip Information, Public Transportation Management, En-Route Transit Information		
COSTS			
Study/Design	$46,000	***Additional Annual Agency Personnel:***	$145,000
Implementation:	$273,000	***Annual Operations & Maintenance:***	$50,000
Communications:			
- Capital	None	***Service Life (Years);***	20
- Annual Lease	$24,000		
STAFFING REQUIREMENTS			
- Engineering Supervisor	***.5***	***- Field Supervisor***	.5
- Staff Engineer	1.0	***- Field Technician***	1.0
BENEFITS			
Annual User Benefits:	$1,900,000	***Benefit/Cost Ratio:***	7.3
Other:			
FUNDING SOURCES:	STP		
PUBLIC/PRIVATE PARTNERSHIP:	Possible for information dissemination purposes. Also it is possible for private entities to operate and maintain operations and maintenance.		
INSTITUTIONAL CONSIDERATIONS:	Requires lead agency for implementation as well as operations and maintenance.		
COMMENTS:	M3.2 (Expert Systems Operational Test) provides input to this project.		

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: M3.2 Expert Systems Operational Test

DESCRIPTION:	Design and implement operational test to evaluate the effectiveness of expert systems to support the incident management function of the ATMIC.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design	$69,000	***Addition& Annual Agency Personnel:***	$16,000
Implementation:	$114,000	***Duration:***	2 years
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	***5***
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	***.2***	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$300,000	***Benefit/Cost Ratio:***	***5.4***
Other:			
FUNDING SOURCES:	IVHS Act, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	There might be a role for private entities, especially relative to dissemination element of this program.		
INSTITUTIONAL CONSIDERATIONS:	Several agencies should be involved during this project. Lead agency is required.		
COMMENTS:	The project should be coordinated with M3.1, ATMIC, as it provides a component for system integration.		

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: M3.3 Smart Corridor Operational Test

DESCRIPTION:	Design and implement operational test to evaluate the effectiveness of the concept of integration of freeway and arterial traffic control and information systems. Approximately 30 intersections in the I-80 corridor are included.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Incident Management, Pre-Trip Information		
COSTS			
Study/Design:	$ 207,000	***Additional Annual Agency Personnel:***	$123,000
Implementation:	$1,898,000	***Duration:***	4 years
Communications:		***Annual Operations & Maintenance:***	$50,000
- Design	$180,000		
- Capital	$1,500,000	***Service Life Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	***.5***	***- Field Supervisor***	***.25***
- Staff Engineer	1.0	***- Field Technician***	.75
BENEFITS			
Annual User Benefits:	$7,500,000	***Benefit/Cost Ratio:***	6.8
Other:			
FUNDING SOURCES:	IVHS Act, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Possibility in the area of communications and motorist information system.		
INSTITUTIONAL CONSIDERATIONS:	NDOT, City of Omaha, police departments, 911, fire departments and others should reach consensus on various elements of the program.		
COMMENTS:	This operational test provides the basis for L3.2, Smart Corridor Implementation Project.		

CATEGORY:	**Area-wide Traffic Management and Information Center (ATMIC)**
PROJECT:	**M3.4 Ramp Metering - Phase I**

DESCRIPTION:	Design and implement ramp metering to address recurrent and non-recurrent congestion on freeways in priority corridors. Phase I provides metering on approximately 10 ramps to support incident management.		
APPLICABLE USER SERVICE:	Traffic Control, Incident Management		
COSTS:			
Study/Design	$83,000	No additional personnel is assumed.	
Implementation:	$759,000	Additional maintenance and operations is assumed to be borne by NDOR.	
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS:	No additional staffing is assumed.		
BENEFITS			
Annual User Benefits:	$1,100,000	***Benefit/Cost Ratio:***	11
Other:			
FUNDING SOURCES:	STP, NHS		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Public education and effective design of the systems is important.		
COMMENTS:	This project reduces traffic demand and recovery times at incident locations.		

CATEGORY: Traveler Information Systems

PROJECT: M4.1 Radio Data System (RDS) Operational Test

DESCRIPTION:	Design and implement operational test to evaluate the effectiveness of RDS.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management, Pre-Trip Information		
COSTS			
Study/Design	$69,000	***Additional Annual Agency Personnel:***	$8,000
Implementation:	$127,000	***Annual Operations & Maintenance:***	$20,000
Communications:			
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$150,000	***Benefit/Cost Ratio:***	1.9
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility with media.		
INSTITUTIONAL CONSIDERATIONS:	Discussion among agencies are required for consistency and accuracy of information. In addition, the type of arrangement with media should carefully be looked at.		
COMMENTS:	Very cost-effective approach to inform users.		

CATEGORY: Traveler Information Systems

PROJECT: M4.2 Highway Advisory Radio (HAR) - Phase II

DESCRIPTION:	Install approximately two 10-watt and 13 0.l-watt HAR units to serve remaining priority corridors not included in Phase I. Also, define functional requirements and develop operational procedures for real-time message generation. Conduct operational test of real-time message generation involving approximately five HARs.
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management

COSTS:

Study/Design	$37,000	***Additional Annual Agency Personnel:***	($38,000 first 3 years for design and implementation, then $8,000 per year)
Implementation:	$342,000	***Annual Operations & Maintenance:***	$19,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		

STAFFING REQUIREMENTS

- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	.3	***- Field Technician***	***.3***

BENEFITS

Annual User Benefits:	$190,000	***Benefit/Cost Ratio:***	2.44
Other:			

FUNDING SOURCES:	STP, CMAQ
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility with private entities interested in disseminating traveler information.
INSTITUTIONAL CONSIDERATIONS:	Credibility of the information is at stake in terms of information accuracy, timeliness, and applicability.
COMMENTS:	This project's effectiveness will be enhanced in concert with Phases I and III. This project increases route diversion, reducing traffic demand and recovery times at congested locations.

CATEGORY: Traveler Information Systems

PROJECT: M4.3 Changeable Message Signs (CMS) - Phase II

DESCRIPTION:	Design and install CMS at approximately four locations on freeways and 14 locations on arterials to serve remaining priority corridors not included in Phase I. Also, conduct operational test to evaluate the effectiveness of real-time message generation and route guidance via expert systems.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management		
COSTS:			
Study/Design	$173,000	***Additional Annual Agency Personnel:***	$29,000
Implementation:	$1,645,000	***Annual Operations & Maintenance:***	$90,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$50,000		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	***.2***	***- Field Technician***	***.2***
BENEFITS			
Annual User Benejits:	$540,000	***Benefit/Cost Ratio:***	1.4
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Not common in this project, although CMS offers opportunity for potential advertising.		
INSTITUTIONAL CONSIDERATIONS:	Effectiveness of CMS is an issue dependent on the accuracy of the message and its timeliness.		
COMMENTS:	High priority since several programs are dependent upon CMS, such as incident management.		

CATEGORY: Traveler Information Systems

PROJECT: M4.4 Cable TV (CATV) System - Phase II

DESCRIPTION:	Enhance CATV system implemented in Phase I to provide congestion display graphics and conduct operational test to evaluate teletext service.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS:			
Study/Design	$17,000	***Additional Annual Agency Personnel:***	$8,000
Implementation:	$127,000	***Annual Operations & Maintenance:***	$40,000
Communications:			
- Design	$72,000		
- Capital	$600,000	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	***.05***	***- Field Supervisor***	
- Staffs Engineer	.2	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$460,000	***Benefit/Cost Ratio:***	2.6
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong public/private opportunity exists where a vendor provides funding in exchange with access/use of the CATV facilities.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required to supervise the design and implementation of this program,		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: **Traveler Information Sys terns**

PROJECT: **M4.5 Kiosks/Videotex System - Phase II**

DESCRIPTION:	Expand kiosk/videotex system to include 20 additional locations. Enhance capabilities of 10 kiosks implemented in Phase I to include two-way communications, interactive information access, and expanded information database including transit service.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information, En-Route Transit Information		
COSTS:			
Study/Design	$102,000	***Additional Annual Agency Personnel:***	$20,000
Implementation:	$380,000	***Annual Operations & Maintenance:***	$120,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$14,000		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.2	***- Field Technician***	.I
BENEFITS			
Annual User Benefits:	$200,000	***Benefit/Cost Ratio: 0.9***	
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility.		
INSTITUTIONAL CONSIDERATIONS:	Identification of location, content of the database, sequencing, etc. are key factors for the success of this program.		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: M4.6 Internet/Computer Bulletin Board System (BBS) - Phase II

DESCRIPTION:	Enhance BBS system implemented in Phase I to include interactive displays and expanded information database.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS:			
Study/Design	$17,000	***Additional Annual Agency Personnel:***	$8,000
Implementation:	$14,000	***Annual Operations & Maintenance:***	$12,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENT:			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$180,000	***Benefit/Cost Ratio:***	7.2
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility either independently or as part of other traveler information systems projects.		
INSTITUTIONAL CONSIDERATIONS:	Requires lead agency for consistency and coordination.		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: M4.7 Highway Advisory Telephone (HAT) - Phase II

DESCRIPTION:	Implement HAT system defined in short-term study (Project S4.7), including software development.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS:			
Study/Design	$115,000	***Additional Annual Agency Personnel:***	$13,000
Implementation:	$127,000	***Annual Operations & Maintenance:***	$14,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.2	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$91,000	***Benefit/Cost Ratio:***	1.4
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility independently or as part of other ITS projects.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency for consistency and coordination is required.		
COMMENTS	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: M4.8 Transit Vehicle Status Monitoring Operational Test

DESCRIPTION:	Design and implement operational test to evaluate the feasibility of real-time transit vehicle status monitoring using automated vehicle locator technologies.		
APPLICABLE USER SERVICE:	Pre-Trip Information, Public Transportation Management, En-Route Transit Information		
COSTS:			
Study/Design	$35,000	***Additional Annual Agency Personnel:***	$23,000
Implementation:	$316,000	***Duration:***	3 years
Communications:		***Annual Operations & Maintenance:***	$35,000
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	.05
- Staff Engineer	.2	***- Field Technician***	.1
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Improves schedule compliance by 10 to 25 percent, and reduces operating expenses by 2 to 9 percent.		
FUNDING SOURCES:	Section 3 Capital Program ISTEA, Planning and Research Fund ISTEA		
PUBLIC/PRIVATE PARTNERSHIP:	Not common, although the system data could be shared with other public/private entities.		
INSTITUTIONAL CONSIDERATIONS:			
COMMENTS:	Essential for deployment of transit management and information user services.		

CATEGORY: Incident Management

PROJECT: M5.1 Freeway Service Patrol (FSP) - Phase II

DESCRIPTION:	Expand FSP to operate during weekday peak periods over approximately 40 miles of the freeways in the priority corridors.
APPLICABLE USER SERVICE:	Incident Management

COSTS

Study/Design	None	***Additional Annual Agency Personnel:***	$157,000 (includes Phase I staffing)
Implementation:	$200,000	***Annual Operations & Maintenance:***	$200,000 (includes Phase I O&M)
Communications:	Included in O&M		
		Service Life (Years):	5

STAFFING REQUIREMENTS

- Drivers	8	***- Field Supervisor***	.1
- Staff Engineer	.4	***- Drivers***	.3

BENEFITS

Annual User Benefits: $2,000,000 ***Benefit/Cost Ratio:*** 4.9

Other: Very well received by the public.

FUNDING SOURCES: HES

PUBLIC/PRIVATE PARTNERSHIP: Strong possibility to involve private tow truck companies.

INSTITUTIONAL CONSIDERATIONS: Lead agency is required for coordination. In addition, public education is necessary for this project.

COMMENTS: Several of the existing FSP programs use private tow truck companies. This project improves public relations and reduces duration of incidents.

CATEGORY: Incident Management

PROJECT: M5.2 Accident Investigation Sites

DESCRIPTION:	Design and construct accident investigation sites at approximately eight locations along the freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design:	$80,000	***Additional Annual Agency Personnel:***	$23,000
Implementation:	$720,000	***Duration:***	4 years
Communications:		***Annual Operations & Maintenance:***	$40,000
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	.1
- Staff Engineer	.1	***- Field Technician***	.25
BENEFITS			
Annual User Benefits:	$1,000,000	***Benefit/Cost*** Ratio: 7.1	
Other:			
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required for implementation and maintenance.		
COMMENTS:	This project reduces duration of incidents.		

CATEGORY: Incident Management

PROJECT: M5.3 Equipment Storage Sites

DESCRIPTION:	Design and construct equipment storage sites at approximately three strategic locations along the freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design	$60,000	***Additional Annual Agency Personnel:***	$15,000
Implementation:	$540,000	***Annual Operations & Maintenance:***	$60,000
Communications:			
- Capital	None	***Service Life (years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	.05
- Staff Engineer	.1	***- Field Technician***	.1
BENEFITS			
Annual User Benefits:	$500,000	***Benefit/Cost Ratio: 8.5***	
Other:			
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required for design, implementation and maintenance.		
COMMENTS:	Storage sites should be identified at strategic locations with balanced access to priority corridors. This project reduces incident response times.		

CATEGORY: Incident Managemet

PROJECT: MS.4 Incident Management Team Support - Phase II

DESCRIPTION:	Continue activities of the incident management team established in Phase I and update incident management manual.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design and Implementation:	$90,000	***Additional Annual Agency Personnel:***	None
		Annual Operations & Maintenance:	None
Communications:			
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Improves effectiveness of incident management.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Coordination with private service providers and possible partnership is applicable in this project such as hospitals.		
INSTITUTIONAL CONSIDERATIONS:	Team approach and clear roles and responsibilities for various events is necessary for success of this program.		
COMMENTS:	Establishment of this program is already underway. Essential for effective and coordinated incident management.		

CATEGORY: Travel Demand Management

PROJECT: M6.1 HOV Needs Study

DESCRIPTION:	Evaluate the need for HOV facilities in the priority corridors.		
APPLICABLE USER SERVICE:	Demand Management and Operations		
COSTS			
Study/Design	$50,000	***Additional Annual Agency Personnel:***	$11,000
Implementation:	None	***Duration:***	1 year
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Determines the feasibility of HOV facilities which may reduce vehicle demand in priority corridors.		
FUNDING SOURCES:	NHS, STP		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	This project requires a lead agency and coordination between agencies along all priority corridors.		
COMMENTS:			

CATEGORY: Travel Demand Management

PROJECT: M6.2 Demand Management Support - Phase I

DESCRIPTION:	Continue on-going travel demand management activities including maintenance of rideshare database and studies to identify feasible travel demand management programs.		
APPLICABLE USER SERVICE:	Demand Management and Operations, Pre-Trip Information, Ride Matching and Reservation		
COSTS			
Study/Design	$65,000	***Additional Annual Agency Personnel:***	None
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	5
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Reduces vehicular traffic demand at congested locations.		
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility, especially with large employers		
INSTITUTIONAL CONSIDERATIONS:	Lead agency required.		
COMMENTS:	This project's effectiveness is enhanced when continued as Project L6.2, Phase II. This project is essential to effective deployment of ITS travel demand management user services.		

CATEGORY: Travel Demand Management

PROJECT: M6.3 Park-and-Ride Implementation - Phase I

DESCRIPTION:	Design and implement park-and-ride facilities at approximately five locations in the priority corridors.		
APPLICABLE USER SERVICE:	Demand Management and Operations		
COSTS			
Study/Design	$50,000	***Additional Annual Agency Personnel:***	$16,000
Implementation:	$450,000	***Duration:***	2 years
Communications:		***Annual Operations & Maintenance:***	$50,000
- Capital	None	***Service Life (Years):***	20
-Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	***.2***
BENEFITS			
Annual User Benefits:	$360,000	***Benfit/Cost*** Ratio: 3.3	
Other:			
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Arrangements are possible with private entities so that existing/proposed lots could be used for multi-purposes.		
INSTITUTIONAL CONSIDERATIONS:	Maintenance of park-and-ride lots will be an issue for consideration.		
COMMENTS:	When right-of-way is available, this could be a cost-effective measure for demand management.		

CATEGORY: Travel Demand Management

PROJECT: M6.4 Smart Transit Service Operational Test

DESCRIPTION:	Design and implement operational test of smart transit service in approximately two lower density areas in the metropolitan area where this service is determined to be feasible. Operational test and evaluation will be performed for six months during each project.
APPLICABLE USER SERVICE:	Demand Management and Operations, Public Transportation Management, Personalized Public Transit

COSTS

Study/Design	$30,000	***Additional Annual Agency Personnel:***	$29,000
Implementation:	$270,000	***Duration:***	2 years
Communications:		***Annual Operations & Maintenance:***	$30,000
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		

STAFFING REQUIREMENTS

- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Stafjc Engineer	***.2***	***- Field Technician***	***.2***

BENEFITS

Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Demonstrates the feasibility of mode of transit operations which may increase use of transit in lower density areas.

FUNDING SOURCES:	MATC (with 50% local match)
PUBLIC/PRIVATE PARTNERSHIP:	Possible with transit service and systems providers.
INSTITUTIONAL CONSIDERATIONS:	
COMMENTS:	Good source of funding already earmarked.

CATEGORY: Travel Demand Management

PROJECT: M6.5 Smart Card

DESCRIPTION:	Design and implement operational test to evaluate the benefits of a smart card system for payment of transportation services, such as transit and parking.		
APPLICABLE USER SERVICE:	Electronic Payment Services		
COSTS			
Study/Design	$69,000	***Additional Annual Agency Personnel:***	$16,000
Implementation:	$632,000	***Duration:***	5 years
Communications:		No Annual Operations & Maintenance is assumed.	
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	***.2***	***- Field Technician***	
BENEFITS			
Annual User Benejits:		***Benefit/Cost Ratio:***	
Other:	Improves efficiency of transit operations.		
FUNDING SOURCES:	Section 3 Capital Program of ISTEA		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility for private entities to design and manage this program.		
INSTITUTIONAL CONSIDERATIONS:	Public acceptability and agreements among service provider agencies.		
COMMENTS:	This technology is already being used around the country.		

CATEGORY: Deployment Support

PROJECT: M7.1 Traffic Management Forum - Phase II

DESCRIPTION:	Continue activities of the Traffic Management Forum established in Phase I. Activities in Phase II focus on the ATMIC, adaptive traffic control, and advanced traffic controllers as well as on-going discussions of signal coordination.
APPLICABLE USER SERVICE:	Traffic Control
COSTS:	No cost has been assumed.
STAFFING REQUIREMENTS:	No additional staffing has been assumed.
BENEFITS	
Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates the deployment of ITS technologies and implementation of ATMIC.
FUNDING SOURCES:	Not needed.
PUBLIC/PRIVATE PARTNERSHIP:	Not applicable.
INSTITUTIONAL CONSIDERATIONS:	Consensus building will be a key issue at this Forum. A lead agency should be identified which could possibly rotate, per members' wishes.
COMMENTS:	This forum is considered an important arena to discuss traffic management and signal coordination issues.

CATEGORY: Deployment Support

PROJECT: M7.2 Public/Private Partnerships - Phase II

DESCRIPTION:	Continue activities of the public/private partnership committee established in Phase I. Activities in Phase II focus on RDS, kiosks/videotex, CATV, HAT and BBS systems; rideshare database; and park-and-ride facilities.
APPLICABLE USER SERVICE:	Incident Management, Demand Management and Operations, Pre-Trip Information, Ride Matching and Reservation
COSTS:	No cost has been assumed.
STAFFING REQUIREMENTS:	No additional staffing has been assumed.
BENEFITS:	
Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates the deployment of ITS technologies.
FUNDING SOURCES:	Not needed.
PUBLIC/PRIVATE PARTNERSHIP:	
INSTITUTIONAL CONSIDERATIONS:	A lead agency is required to start this program.
COMMENTS:	This program is important as it should identify a market for the strategic deployment business plan and facilitate various partnerships.

CATEGORY: Deployment Support

PROJECT: M7.3 Education Program - Phase II

DESCRIPTION:	Continue development and implementation of ITS education programs for users, operators, officials, and public. Phase II focuses on ATMIC, adaptive traffic control, advanced traffic controllers, park-and-ride, smart transit, and smart card.		
APPLICABLE USER SERVICE:	Traffic Control, Demand Management and Operations, Personalized Public Transit, Electronic Payment Services		
COSTS:			
Study/Design and Implementation:	$287,000	***Additional Annual Agency Personnel:***	$11,000
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Increases technical knowledge of responsible agencies and promotes ITS deployment.		
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	It is possible for certain private entities to sponsor materials, etc.		
INSTITUTIONAL CONSIDERATIONS:	This program should be developed carefully with stakeholders' input and include a wide range of audience.		
COMMENTS:	Very important as it is considered a key element relative to the success of ITS deployment and users' acceptance.		

CATEGORY: Deployment Support

PROJECT: M7.4 Intermodal Coordination Program - Phase II

DESCRIPTION:	Continue activities of intermodal coordination committee established in Phase I.		
APPLICABLE USER SERVICE:	Travel Service Information, Demand Management and Operations, Pre-Trip Information, Public Transportation Management, Freight Mobility		
COSTS			
Study/Design:	$115,000	***Additional Annual Agency Personnel:***	$11,000
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	***5***
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benfits:		***Benefit/Cost Ratio:***	
Other:	Facilitates ITS deployment.		
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Private service providers and various user organizations should be involved in this program.		
INSTITUTIONAL CONSIDERATIONS:	A lead agency is required to establish this program.		
COMMENTS:			

CATEGORY: Deployment Support

PROJECT: M7.5 Area-wide Signing and Striping Database - Phase II

DESCRIPTION:	Expand signing and striping database developed in Phase I to include all freeways and arterials in the metropolitan area.		
APPLICABLE USER SERVICE:	Route Guidance		
COSTS			
Study/Design	$138,000	***Additional Annual Agency Personnel:***	$19,000
Implementation:	$32,000	***Duration:***	2 years
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	10
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	11
- Staff Engineer	.2	***- Field Technician***	.1
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Essential for in-vehicle traveler information system in long-term and supports traffic control and incident management.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Access to this database may be of interest to many private organizations.		
INSTITUTIONAL CONSIDERATIONS:	Formatting, extent of the content of the database, and compatibility with other agency databases will be key considerations for the success of this program.		
COMMENTS:			

CATEGORY: Signal Systems

PROJECT: L1.l Adaptive Traffic Control Implementation

DESCRIPTION:	Implement adaptive traffic control based on results of operational test (Project M1.4). Implementation begins in most congested priority corridors and then proceeds to remaining priority corridors.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS:			
Study/Design:	$253,000	***Additional Annual Agency Personnel:***	$18,000
Implementation:	$2,404,000	***Annual Operations & Maintenance:***	$410,000
Communications:			
- Design	$159,000		
- Capital	$1,325,000	***Service Life (years):***	10
- Annual Lease	$120,000		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.3	***- Field Supervisor***	.2
- Staff Engineer	1.0	***- Field Technician***	1.0
BENEFITS:			
Annual User Benefits:	$14,000,000	***Benefit/Cost Ratio: 13***	
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possible, especially in the area of information dissemination.		
INSTITUTIONAL CONSIDERATIONS:	Public education is an important element in this project as drivers' expectations of the traffic signal operation changes.		
COMMENTS:			

CATEGORY: **Signal Systems**

PROJECT: **L1.2 Advanced Traffic Control Implementation**

DESCRIPTION:	Implement advanced traffic controller technology based on results of operational test (Project M1.5) to ultimately include all priority corridors.		
APPLICABLE USER SERVICE:	Traffic Control		
COSTS:			
Study/Design:	$128,000	***Additional Annual Agency Personnel:***	$56,000
Implementation:	$1,265,000	***Annual Operations &Maintenance:***	$140,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	.5	***- Field Technician***	***.5***
BENEFITS			
Annual User Benefits:	$750,000	***Benefit/Cost Ratio:. 1.8***	
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possibility will be to attract vendors and/or entities interested in using some of the ATC features such as air quality measurement, etc.		
INSTITUTIONAL CONSIDERATIONS:			
COMMENTS:			

CATEGORY: Surveillance

PROJECT: L2.1 Advanced Surveillance/Monitoring Systems

DESCRIPTION:	Design and implement advanced surveillance and monitoring system to support ATMIC functions and public transportation management and information systems.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Incident Management, Pre-Trip Information, Public Transportation Management, En-Route Transit Information, Personalized Public Transit		
COSTS:			
Study/Design:	$276,000	***Additional Annual Agency Personnel:***	$31,000
Implementation:	$2,530,000	***Annual Operations & Maintenance:***	$280,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.2	***- Field Supervisor***	***.2***
- Staff Engineer	1.0	***- Field Technician***	1.0
BENEFITS:			
Annual User Benefits:	$3,400,000	***Benefit/Cost Ratio:***	4.4
Other:			
FUNDING SOURCES:	CMAQ, STP, IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Possible opportunity subject to institutional considerations.		
INSTITUTIONAL, CONSIDERATIONS:	The privacy issue should be discussed as well as opportunities for public/private partnerships for other public or private interested parties to access the view.		
COMMENTS:	This project will significantly improve the capabilities of the ATMIC.		

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: L3.1 Expert Systems Implementation

DESCRIPTION:	Design and implement expert system to support ATMIC functions based on results of operational test (Project M3.2).
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Incident Management, Pre-Trip Information, En-Route Transit Information

COSTS:

Study/Design:	$138,000	***Additional Annual Agency Personnel:***	$35,000
Implementation:	$1,265,000	***Annual Operations & Maintenance:***	$140,000
Communications:			
- Capital	None	***Service Life (years):***	10
- Annual Lease	None		

STAFFING REQUIREMENTS:

- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	***.5***	***- Field Technician***	

BENEFITS:

Annual User Benefits: $3,400,000 ***Benefit/Cost Ratio: 8.5***

Other:

FUNDING SOURCES: CMAQ, IVHS Act

PUBLIC/PRIVATE PARTNERSHIP: There might be a role for private entities, especially relative to dissemination element of this program.

INSTITUTIONAL CONSIDERATIONS: Several agencies should be involved during this project. Lead agency is required.

COMMENTS: This project should follow M3.2

CATEGORY: Area-wide Traffic Management and Information Center (ATMIC)

PROJECT: L3.2 Smart Corridor Implementation

DESCRIPTION:	Design and implement expansion of the smart corridor based on results of the operational test (Project M3.3). Expansion involves integration of freeway and arterial traffic control in priority corridors including l-680 and West Dodge Road.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traffic Control, Incident Management, Pre-Trip Information		
COSTS:			
Study/Design:	$552,000	***Additional Annual Agency Personnel:***	$31,000
Implementation:	$5,060,000	***Annual Operations & Maintenance:***	$550,000
Communications:			
- Design			
- Capital		***Service Life (Years):***	10
- Annual Lease			
STAFFING REQUIREMENTS:			
- Engineering Supervisor	.2	***- Field Supervisor***	.2
- Staff Engineer	1.0	***- Field Technician***	1.0
BENEFITS:			
Annual User Benefits:	$8,100,000	***Benefit/Cost Ratio: 5.4***	
Other:			
FUNDING SOURCES:	IVHS Act, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Possibility in the area of communications and motorist information system.		
INSTITUTIONAL CONSIDERATIONS:	NDOT, City of Omaha, police departments, 911, fire departments and others should reach consensus on various elements of the program.		
COMMENTS:			

CATEGORY:	**Area-wide Traffic Management and Information Center (ATMIC)**
PROJECT:	**L3.3 Ramp Metering - Phase II**

DESCRIPTION:	Design and implement expansion of ramp metering on freeways in priority corridors to include approximately 15 additional ramps.		
APPLICABLE USER SERVICE:	Traffic Control, Incident Management		
COSTS:			
Study/Design:	$124,000	No additional personnel is assumed.	
Implementation:	$1,139,000	Annual Operations & Maintenance is assumed to be borne by NDOR.	
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$18,000		
STAFFING REQUIREMENTS:	No additional staffing is assumed.		
BENEFITS:			
Annual User Benefits:	$880,000	Benefit/Cost Ratio: 5.2	
Other:			
FUNDING SOURCES:	STP, NHS		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	Public education and effective design of the systems is important.		
COMMENTS:	This project reduces traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: L4.1 Radio Data System (RDS) Implementation

DESCRIPTION:	Design and implement area-wide RDS based on results of operational test (Project M4.1).		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management, Pre-Trip Information		
COSTS			
Study/Design:	$92,000	***Additional Annual Agency Personnel:***	$19,000
Implementation:	$152,000	***Annual Operations & Maintenance:***	$25,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	***.25***	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$360,000	***Benefit/Cost Ratio:*** 4.3	
Other:			
FUNDING SOURCES:	IVHS Act		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility with media.		
INSTITUTIONAL CONSIDERATIONS:	Discussion among agencies are required for consistency and accuracy of information. In addition, the type of arrangement with media should carefully be looked at.		
COMMENTS:	Very cost-effective approach to inform users. This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: L4.2 Highway Advisory Radio (HAR) - Phase III

DESCRIPTION:	Design and implement expansion of HAR to include approximately nine additional 0. l-watt HAR units and area-wide reaI-time message generation.
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management

COSTS

Study/Design:	$31,000	***Additional Annual Agency Personnel:***	($29,000 first 2 years, then $6,000 per year)
Implementation:	$285,000	***Annual Operations & Maintenance:***	$31,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$21,000		

STAFFING REQUIREMENTS

- Engineering Supervisor	.l	***- Field Supervisor***	.l
- Staff Engineer	***.2***	***- Field Technician***	***.2***

BENEFITS

Annual User Benefits:	$220,000	***Benefit/Cost Ratio: 2.2***	
Other:			

FUNDING SOURCES:	STP, CMAQ
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility with private entities interested in disseminating traveler information.
INSTITUTIONAL CONSIDERATIONS:	Credibility of the information is at stake in terms of information accuracy, timeliness, and applicability.
COMMENTS:	This project's effectiveness will be enhanced to follow after Phase I and II. This project increases route diversion, reducing traffic demand and recovery times at congested locations.

CATEGORY: Traveler Information Systems

PROJECT: L4.3 Changeable Message Signs (CMS) - Phase III

DESCRIPTION:	Design and implement expansion of CMS system to include additional CMS installations at approximately four freeway and ten arterial street locations, and area-wide real-time message generation.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Incident Management		
COSTS			
Study/Design:	$169,000	***Additional Annual Agency Personnel:***	$29,000
Implementation:	$1,555,000	***Annual Operations &Maintenance:***	$160,000
Communications:			
- Capital	None	***Service Life (years):***	20
- Annual Lease	$2 1,000		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.l	***- Field Supervisor***	.1
- Staff Engineer	.2	***- Field Technician***	***.2***
BENEFITS			
Annual User Benefits:	$310,000	***Benefit/Cost Ratio:***	0.8
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Not common in this project, although CMS offers opportunity for potential advertising.		
INSTITUTIONAL CONSIDERATIONS:	Effectiveness of CMS is an issue dependent on the accuracy of the message and its timeliness.		
COMMENTS:	Important since several programs are dependent upon CMS, such as incident management.		

CATEGORY: Traveler Information Systems

PROJECT: L4.4 CabIe TV (CATV) System - Phase III

DESCRIPTION:	Design and implement enhancement of CATV system to provide interactive teletext service.		
APPLICABLE USER SERVICE:	Incident Management, Pre-Trip Information		
COSTS			
Study/Design:	$17,000	***Additional Annual Agency Personnel:***	$8,000
Implementation:	$137,000	***Annual Operations & Maintenance:***	$15,000
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	
BENEFITS			
Annual User Benefits:	$540,000	***Benefit/Cost Ratio:***	1 1
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong public/private opportunity exists where a vendor provides funding in exchange with access/use of the CATV facilities.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required to supervise the design and implementation of this program.		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: L4.5 Kiosks/Videotex System - Phase III

DESCRIPTION:	Design and implement expansion of kiosk/videotex system at 21 new locations and upgrade system to provide interactive capabilities,		
APPLICABLE USER SERVICE:	Traveler Services Information, Incident Management, Pre-Trip Information		
COSTS			
Study/Design:	$76,000	***Additional Annual Agency Personnel:***	$32,000
Implementation:	$506,000	***Annual Operations & Maintenance:***	$126,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	$50,000		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	.05
- Staff Engineer	.3	***- Field Technician***	***.2***
BENEFITS			
Annual User Benefits:	$65,000	***Benefit/Cost Ratio:***	0.2
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility.		
INSTITUTIONAL CONSIDERATIONS:	Identification of location, content of the database, sequencing, etc. are key factors for success of this program.		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Traveler Information Systems

PROJECT: L4.6 In-Vehicle Traveler Information System Operational Test

DESCRIPTION:	Design and implement operational test of in-vehicle traveler information to evaluate system effectiveness.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traveler Services Information, Incident Management		
COSTS			
Study/Design:	$138,000	***Additional Annual Agency Personnel:***	$62,000
Implementation:	$1,265,000	***Duration;***	4 years
Communications:		***Annual Operations & Maintenance:***	$140,000
- Capital	None		
- Annual Lease	$10,000	***Service Life (Years):***	5
STAFFING REQUIREMENTS			
- Engineering Supervisor	.2	***- Field Supervisor***	.1
- Staff Engineer	.5	*- Field Technician*	.5
BENEFITS			
Annual User Benefits:	$32,000	***Benefit/Cost Ratio:***	0.06
Other:			
FUNDING SOURCES:	STP, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility to work with automobile manufacturers and related industries.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required to manage this task.		
COMMENTS:	This project increases route diversion, reducing traffic demand and recovery times at congested locations.		

CATEGORY: Incident Management

PROJECT: L5.1 Freeway Service Patrol (FSP) - Phase III

DESCRIPTION:	Continue operation of FSP during weekday peak periods over approximately 40 miles of the freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design:	None	***Additional Annual Agency Personnel:***	$157,000
Implementation:	$400,000	***Annual Operations & Maintenance:***	$200,000
Communications:	Included in O&M		
		Service Life (Years):	10
STAFFING REQUIREMENTS			
- Drivers	8	***- Field Supervisor***	.1
- Staff Engineer	.4	***- Drivers***	***.3***
BENEFITS			
Annual User Benefits:	$2,000,000	***Benefit/Cost Ratio:***	4.9
Other:	Very well received by the public.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility to involve private tow companies.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency is required for coordination. In addition, public education is necessary for this project.		
COMMENTS:	Several of the existing FSP programs use private tow truck companies. This project improves public relations and reduces duration of incidents.		

CATEGORY: Incident Management

PROJECT: L5.2 Incident Management Team Support - Phase III

DESCRIPTION:	Continue activities of the incident management team established in Phase I.		
APPLICABLE USER SERVICE:	Incident Management		
COSTS			
Study/Design:		***Additional Annual Agency Personnel:***	None
Implementation:	$180,000	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Improves effectiveness of incident management.		
FUNDING SOURCES:	HES		
PUBLIC/PRIVATE PARTNERSHIP:	Coordination with private service providers and possible partnership is applicable in this project such as hospitals.		
INSTITUTIONAL CONSIDERATIONS:	Team approach and clear roles and responsibilities for various events is necessary for success of this program.		
COMMENTS:	Establishment of this program is already underway. Essential for effective and coordinated incident management.		

CATEGORY: Travel Demand Management

PROJECT: M.l HOV Design and Implementation

DESCRIPTION:	Design and implement HOV facilities on approximately 10 miles of freeways in the priority corridors.		
APPLICABLE USER SERVICE:	Demand Management and Operations		
COSTS			
Study/Design:	$2,760,000		
Implementation:	$39,220,000	Added operations & maintenance is assumed at 1% over and above the ongoing maintenance provided by NDOR	$420,000
Communications:			
- Capital	None	***Service Life (Years):***	20
- Annual Lease	None		
STAFFING REQUIREMENTS	No added personnel is assumed.		
BENEFITS			
Annual User Benefits:	$100,000	***Benefit/Cost Ratio:***	0.02
Other:			
FUNDING SOURCES:	STP, NHS, CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Not common for this project.		
INSTITUTIONAL CONSIDERATIONS:	This project requires a lead agency and coordination between agencies along all priority corridors.		
COMMENTS:			

CATEGORY: Travel Demand Management

PROJECT: L6.2 Demand Management Support - Phase II

DESCRIPTION:	Continue on-going travel demand management activities including maintenance of rideshare database and studies to identify feasible travel demand programs.		
APPLICABLE USER SERVICE:	Demand Management and Operations, Pre-Trip Information, Ride Matching and Reservation		
COSTS			
Study/Design:	$100,000	***Additional Annual Agency Personnel:***	None
Implementation:	None	***Annual Operations & Maintenance:***	None
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor		***- Field Supervisor***	
- Staff Engineer		***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Reduces vehicular traffic demand at congested locations.		
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Strong possibility, especially with large employers.		
INSTITUTIONAL CONSIDERATIONS:	Lead agency required.		
COMMENTS:	Essential to effective deployment of ITS travel demand management user services.		

CATEGORY: Travel Demand Management

PROJECT: L6.3 Park-and-Ride Implementation - Phase II

DESCRIPTION:	Design and implement expansion of park-and-ride program to add park-and-ride facilities at approximately five more locations in the priority corridors.		
APPLICABLE USER SERVICE:	Demand Management and Operations		
COSTS			
Study/Design:	$50,000	***Additional Annual Agency Personnel:***	$16,000
Implementation:	$450,000	***Duration:***	***2*** years
Communications:		***Annual Operations & Maintenance:***	$50,000
- Capital	***None***		
- Annual Lease	None	***Service Life (Years):***	20
STAFFING REQUIREMENTS			
- Engineering Supervisor	.05	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	.2
BENEFITS			
Annual User Benefits:	$360,000	***Benefit/Cost Ratio: 3.3***	
Other:			
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	Arrangements are possible with private entities so that existing/proposed lots could be used for multi-purposes.		
INSTITUTIONAL CONSIDERATIONS:	Maintenance of park-and-ride lots will be an issue for consideration.		
COMMENTS:	When right-of-way is available, this could be a cost-effective measure for demand management. This project reduces vehicular traffic demand at congested locations.		

CATEGORY: Travel Demand Management

PROJECT: L6.4 Smart Transit Service Implementation

DESCRIPTION:	Design and implement expansion of smart transit service to provide service to additional areas where feasible based on results of operational test (Project M6.4).		
APPLICABLE USER SERVICE:	Demand Management and Operations, Public Transportation Management, Personalized Public Transit		
COSTS			
Study/Design:	$60,000	***Additional Annual Agency Personnel:***	$29,000
Implementation:	$540,000	***Duration:***	***2*** years
Communications:		***Annual Operations & Maintenance:***	$60,000
- Capital	None		
- Annual Lease	None	***Service Life (Years):***	10
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	.1
- Staff Engineer	.2	***- Field Technician***	***.2***
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Increases transit ridership in lower density areas.		
FUNDING SOURCES:	MATC (with 50% local match)		
PUBLIC/PRIVATE PARTNERSHIP:	Possible with transit service and systems providers.		
INSTITUTIONAL CONSIDERATIONS:			
COMMENTS:	Good source of funding already earmarked.		

CATEGORY: Deployment Support

PROJECT: L7.1 Traffic Management Forum - Phase III

DESCRIPTION:	Continue activities of the Traffic Management Forum established in Phase I. Activities in Phase III focus on ATMIC enhancements, smart corridors, ramp metering, and on-going discussions of critical issues identified in earlier phases.
APPLICABLE USER SERVICE:	Traffic Control
COSTS	No cost has been assumed.
STAFFING REQUIREMENTS	No additional staffing has been assumed.
BENEFITS	
Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates the deployment of ITS technologies and effective ATMIC operations.
FUNDING SOURCES:	Not needed.
PUBLIC/PRIVATE PARTNERSHIP:	Not applicable.
INSTITUTIONAL CONSIDERATIONS:	Consensus building will be a key issue at this Forum. A lead agency should be identified which could possibly rotate, per members' wishes.
COMMENTS:	This forum is considered an important arena to discuss traffic management and signal coordination issues.

CATEGORY: Deployment Support

PROJECT: L7.2 Public/Private Partnerships - Phase III

DESCRIPTION:	Continue public/private partnership activities initiated in earlier phases.
APPLICABLE USER SERVICE:	Incident Management, Demand Management and Operations, Pre-Trip Information, Ride Matching and Reservation
COSTS:	No cost has been assumed.
STAFFING REQUIREMENTS:	No additional staffing has been assumed.
BENEFITS:	
Annual User Benefits:	***Benefit/Cost Ratio:***
Other:	Facilitates the deployment of ITS technologies.
FUNDING SOURCES:	Not needed.
PUBLIC/PRIVATE PARTNERSHIP:	
INSTITUTIONAL CONSIDERATIONS:	A lead agency is required to start this program.
COMMENTS:	This program is important as it should identify a market for the strategic deployment business plan and facilitate various partnerships.

CATEGORY: Deployment Support

PROJECT: L7.3 Education Program - Phase III

DESCRIPTION:	Continue development and implementation of education programs initiated in earlier phases as well as new programs pertinent to long-term ITS deployment activities.		
APPLICABLE USER SERVICE:	En-Route Driver Information, Route Guidance, Traveler Services Information, Traffic Control, Incident Management, Demand Management and Operations, Pre-Trip Information, Ride Matching and Reservation, Public Transportation Management, En-Route Transit Information, Personalized Public Transit, Electronic Payment Services, Freight Mobility		
COSTS:			
Study/Design and Implementation:	$350,000	***Additional Annual Agency Personnel:***	$16,000
Communications:		***Annual Operations & Maintenance:***	None
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		
STAFFING REQUIREMENTS			
- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	***.2***	***- Field Technician***	
BENEFITS			
Annual User Benefits:		***Benefit/Cost Ratio:***	
Other:	Increases technical knowledge of responsible agencies and promotes ITS deployment.		
FUNDING SOURCES:	CMAQ		
PUBLIC/PRIVATE PARTNERSHIP:	It is possible for certain private entities to sponsor materials, etc.		
INSTITUTIONAL CONSIDERATIONS:	This program should be developed carefully with stakeholders' input and include a wide range of audience.		
COMMENTS:	Very important as it is considered a key element relative to the success of ITS deployment and users' acceptance.		

CATEGORY: Deployment Support

PROJECT: L7.4 Intermodal Coordination Program - Phase III

DESCRIPTION:	Continue activities of intermodal coordination committee established **in** Phase I.
APPLICABLE USER SERVICE:	Travel Service Information, Demand Management and Operations, Pre-Trip Information, Public Transportation Management, Freight Mobility

COSTS

Study/Design and Implementation:	$230,000	***Additional Annual Agency Personnel:***	$11,000
		Annual Operations & Maintenance:	None
Communications:			
- Capital	None	***Service Life (Years):***	10
- Annual Lease	None		

STAFFING REQUIREMENTS

- Engineering Supervisor	.1	***- Field Supervisor***	
- Staff Engineer	.1	***- Field Technician***	

BENEFITS

Annual User Benejits: ***Benefit/Cost Ratio:***

Other: Facilitates ITS deployment.

FUNDING SOURCES: CMAQ

PUBLIC/PRIVATE PARTNERSHIP: Private service providers and various user organizations should be involved in this program.

INSTITUTIONAL CONSIDERATIONS: Private entities should have a role in this program.

COMMENTS:

PLEASE FAX THE FOLLOWING 3 PAGES TO ABBAS BY IO/17/95
Fax (213) 488-9440

SHORT-TERM	1st Priority	2nd Priority	3rd Priority
. SIGNAL SYSTEMS			
S1.l Signal Timing Plan Development - Phase I			
S1.2 Local Traffic Controller and Detection Improvements - Phase I			
S1.3 Traffic Control Systems			
. SURVEILLANCE			
S2.1 CCTV Installation - Phase I			
. AREA-WIDE TRAFFIC MANAGEMENT AND INFORMATION CENTER ATMIC)			
S3.1 Functional Requirements Study			
S3.2 Design			
. TRAVELER INFORMATION SYSTEMS			
S4.1 Radio Data System (RDS) Development			
S4.2 Highway Advisory Radio (HAR) - Phase I			
S4.3 Changeable Message Signs (CMS) - Phase I			
S4.4 Cable TV System (CATV) - Phase I			
S4.5 Kiosks/Videotex System - Phase I			
S4.6 Internet/Computer Bulletin Board System (BBS) - Phase I			
S4.7 Highway Advisory Telephone (HAT) - Phase I			
. INCIDENT MANAGEMENT			
S5.1 Freeway Service Patrol (FSP) - Phase I			
S5.2 Emergency Vehicle Access			
S5.3 Reference Markers			
S5.4 Incident Management Team Development			
. TRAVEL DEMAND MANAGEMENT			
S6.1 Smart Transit Service Study			
S6.2 Ride-Sharing Database			
S6.3 Park-and-Ride Study			
. DEPLOYMENT SUPPORT			
S7.1 Traffic Management Forum - Phase I			
S7.2 Public/Private Partnerships - Phase I			
S7.3 Education Program - Phase I			
57.4 Intermodal Coordination Program - Phase I			
S7.5 Area-wide Signing and Striping Database - Phase I			

MEDIUM-TERM	1st Priority	2nd Priority	3rd Priority
1. SIGNAL SYSTEMS			
Ml. 1 Signal Timing Plan Development - Phase II			
Ml.2 Local Traffic Controller and Detection Improvements - Phase II			
Ml.3 Traffic Control Systems			
M1.4 Adaptive Traffic Control Operational Test			
M1.5 Advanced Traffic Controller Operational Test			
2. SURVEILLANCE			
M2.1 CCTV Installation - Phase II			
3. AREA-WIDE TRAFFIC MANAGEMENT AND INFORMATION CENTER (ATMIC)			
M3.1 ATMIC Implementation			
M3.2 Expert Systems Operational Test			
M3.3 Smart Corridor Operational Test			
M3.4 Ramp Metering - Phase I			
4. TRAVELER INFORMATION SYSTEMS			
M4.1 Radio Data **System (RDS) Operational Test**			
M4.2 Highway Advisory Radio (HAR) - Phase II			
M4.3 Changeable Message Signs (CMS) - Phase II			
M4.4 Cable TV System (CATV) - Phase II			
M4.5 Kiosks/Videotex System - Phase II			
M4.6 Internet/Computer Bulletin Board System (BBS) - Phase II			
M4.7 Highway Advisory Telephone (HAT) - Phase II			
M4.8 Transit Vehicle Status Monitoring Operational Test			
5. INCIDENT MANAGEMENT			
M5.1 Freeway Service Patrol (FSP) - Phase II			
M5.2 Accident Investigation Sites			
M5.3 Equipment Storage Sites			
M5.4 Incident Management Team Support - Phase II			
6. TRAVEL DEMAND MANAGEMENT			
M6.1 HOV Needs Study			
M6.2 Demand Management Support - Phase I			
M6.3 Park-and-Bide Implementation - Phase I			
M6.4 Smart Transit Service Operational Test			
M6.5 Smart Card			
7. DEPLOYMENT SUPPORT			
M7.1 Traffic Management Forum - Phase II			
M7.2 Public/Private Partnerships - Phase II			
M7.3 Education Program - Phase II			
M7.4 Intermodal Coordination Program - Phase II			
M7.5 Area-wide Signing and Striping Database - Phase II			

LONG-TERM	1st Priority	2nd Priority	3rd Priority
1. SIGNAL SYSTEMS			
L1. 1 Adaptive Traffic Control Implementation			
L1.2 Advanced Traffic Controller Implementation			
2. SURVEILLANCE			
L2.1 Advanced Surveillance/Monitoring System			
3. AREA-WIDE TRAFFIC MANAGEMENT AND INFORMATION CENTER (ATMIC)			
L3.1 Expert Systems Implementation			
L3.2 Smart Corridor Implementation			
L3.3 Ramp Metering - Phase II			
4. TRAVELER INFORMATION SYSTEMS			
L4. 1 Radio Data System (RDS) Implementation			
L4.2 Highway Advisory Radio (HAR) - Phase III			
L4.3 Changeable Message Signs (CMS) - Phase III			
L4.4 Cable TV System (CATV) - Phase III			
L4.5 Kiosks/Videotex System - Phase III			
L4.6 In-Vehicle Travel Information System			
5. INCIDENT MANAGEMENT			
L5.1 Freeway Service Patrol (FSP) - Phase III			
L5.2 Incident Management Team Support - Phase III			
6. TRAVEL DEMAND MANAGEMENT			
L6.1 HOV Design and Implementation			
L6.2 Demand Management Support - Phase II			
L6.3 Park-and-Ride Implementation - Phase II			
L6.4 Smart Transit Service Implementation			
7. DEPLOYMENT SUPPORT			
L7.1 Traffic Management Forum - Phase III			
L7.2 Public/Private Partnerships - Phase II			
L7.3 Education Program - Phase III			
L7.4 Intermodal Coordination Program - Phase III			

APPENDIX G

Support Technologies Descriptions

APPENDIX H

Cost Estimate Assumptions